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U. S. Department of Agriculture

Chrysanthemum
New York, N.Y.
Manual

1949

Gloeckner

CHRYSANTHEMUMS

Chrysanthemum Specialists

The chrysanthemum crop has long been grown by many growers as a catch crop. During the past decade this crop has been rapidly changing its position in the rotation. Today it ranks as the main crop in the rotation.

To produce millions of rooted cuttings requires a specialist. These propagators can handle an order for one hundred thousand as easily as one for ten thousand or less. This specialist will deliver the cuttings to you when you wish to have them so you can follow precision cultural details to make your flower crop pay.

The wise grower of cut flowers will plan his crop so as to eliminate the poor varieties and have his crop in bloom when he feels that market conditions are best. The precision culture of planting, pinching, feeding, watering and spraying is here to stay and all growers of quality stock are rapidly following this procedure.

Likewise, the selling of chrysanthemum cuttings has reached the specialist phase. You want to purchase your cuttings from the person who is posted on the latest information and can help you plan your crop successfully.

Our representatives are all well versed in the culture of chrysanthemums. They know the peculiarities of the various varieties and are capable in planning your requirements for the coming season.

It is a *Gloeckner* service to make available the latest cultural information on this crop.

^{3rd C.}
Gloeckner
&
Company,
Incorporated

15 EAST 26th ST., NEW YORK 10, N. Y.

LExington 2-4197

At Madison Square

MUM MANUAL CONTENTS

Anemone Varieties	38	Pompon Varieties	36-37
Cultural Pointers	1-10	Pot Plant Culture	20-21
Delayed Flowering	11	Pot Plant Varieties	39
Garden Varieties	39	Re-Selection Program	31
Insects and Their Control	22-25	Shading Information	15-19
Large Flowering Varieties	34-35	Single Varieties	38
Newer Insecticides	29	Spring Flowered Chrysanthemums ...	12-14
Novelty Varieties	32-33	Stunt	30
Pests and Their Control	26-28		

TERMS OF SALE

Fifty rooted cuttings of each variety is the minimum that can be supplied.
More than 50 of a variety must be in multiples of 50.

Every effort is being made to re-select all varieties of Chrysanthemums through indexing of the plants used for propagation. For the latest information about Chrysanthemum Stunt, please refer to page 28. The stock of all cuttings to be distributed next Spring has been flowered normally without any apparent sign of stunt. Since complete information is not available on its causes and control, we do not guarantee our cuttings to be free of stunt.

FRED C. GLOECKNER & CO., INC. gives no warranty, express or implied, as to the productiveness of any seeds, plants or bulbs it sells and will not be in any way responsible for the crop. Our liability, in all instances, is limited to the purchase price.

Better Chrysanthemums

CUTTINGS

Cuttings taken from vigorous growing stock, free from disease and insects, rooted in sterilized medium and then removed from this medium at just the right time so as to have sufficient root system will give you maximum results in heavier production and better quality chrysanthemums.

Handling Cuttings

The cuttings you purchase are ready for potting or flatting. Many growers plant these rooted cuttings directly into the final location. Ordinarily they will not require shading, but if they have been several days in transit and have softened up some, or if they are planted during warm, bright weather shading with aster cloth or paper is advisable. Under no circumstances leave the covering on the plants during dull weather or at night. It is well to syringe the plants frequently until they stand up and are showing signs of growth.

Deliveries

With the advent of the time pinch and the precision method of culture it is necessary to have your cuttings arrive at a definite date. To insure proper delivery you must plan your cutting requirements months in advance of the date wanted. We would appreciate it if you could let us know your requirements so that our propagator could plan his growing of stock plants and cuttings more systematically.

Delays

The Railway Express Agency has done a marvelous job during the past several years, but occasionally they have had delays. Chrysanthemum cuttings will be injured from cold as well as being too long in transit. If the cuttings are slightly wilted, they can be immersed in water for a short period and then planted. They will react perfectly to such treatment. If the cuttings have been slightly frozen, placing them in a cool room and thawing them out gradually, or placing them in a pail of cool water to take the frost out will bring them through so that they will do just as well as cuttings that have had nothing happen to them. Of course, if stock is badly frozen, or if long delays have occurred so that the cuttings are heated, yellow or rotted, a claim should be filed at once with the express company.

Air Freight

Air freight is prepared to serve customers who are close to an airport, by phoning them when a shipment arrives, or reconsigning shipments via Railway Express to customers who are too far away to pick up shipments at the airport. Our experience this past season indicates that this service is very practical for the delivery of rooted cuttings in the best condition.



Healthy Well Rooted Cuttings



General View of Propagating Houses

Cultural Pointers

SOILS

Chrysanthemums will grow well in a wide range of soil types but a fibrous silt loam is preferred. Blue grass sod to which rotted manure has been added plus an application of super phosphate will give excellent results. A soil that does not remain too open is preferred for this crop.

Acidity

Evidence shows that the soil reaction should be slightly acid pH 6.5, although in many instances a neutral medium does very well. If your soil tests slightly alkaline apply $\frac{1}{2}$ to one pound of agricultural sulfur per 100 square feet of area. However, if your soil is acid apply 3 to 5 pounds of agricultural ground limestone per 100 square feet of area.

Aeration

Proper drainage and proper aeration of the soil are very vital to good growth. Many times improper drainage of the bench or bed is the reason for a poor crop. No wet spots should ever be present. Soil drainage may be improved by the addition of various materials. Any coarse organic material such as manure, alfalfa hay or clover hay applied at the rate of not to exceed one fourth the volume will separate the soil particles sufficiently to increase pore space. Heavy applications of sand to a soil have not always proven of value to a chrysanthemum crop. Aeration may also be increased by proper cultivation of the soil. Frequent scratchings are recommended during the early growth of the crop.

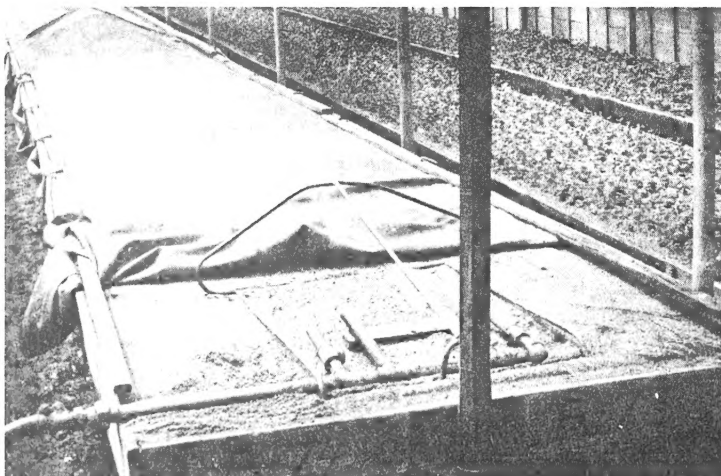
Steam Sterilization

Old soil when properly managed will give comparable results with fresh soil. Add a quarter of the volume of humus in the form of manure or chopped alfalfa or red clover hay. Steam sterilize to destroy the verticillium wilt fungus as well as improve the structure of the soil. Steam sterilization may be done with the use of three inch tile or down spouting with $\frac{1}{8}$ holes drilled every six inches on each side of the pipe. Use two lines in a three and one-half foot bench. Ridge the soil to the center of the bench directly over the lines, covering with tarpaulin, canvas or sisalkraft. The Thomas method is very similar with the exception that the pipe is laid on top of the soil and then covered so as to make it airtight. The Thomas method is not recommended where purlin posts are in the bench.

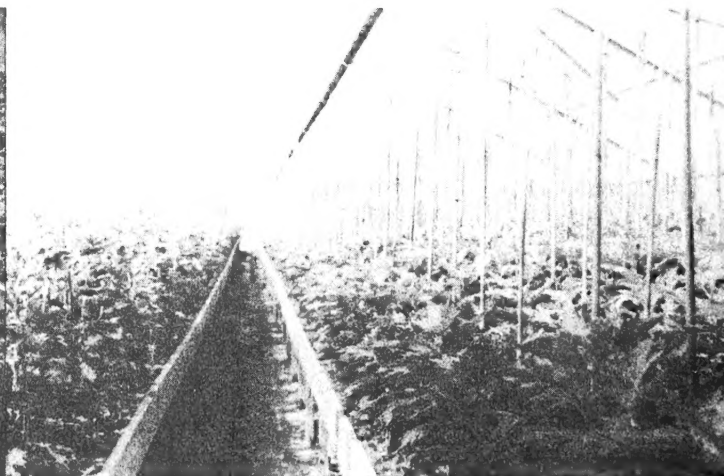
By introducing the steam in the center of a 100 foot bench and sending the steam both directions a more thorough sterilization is accomplished than if the steam were to be forced in at the end of the 100 foot bench. Cover the sides of the benches so that the entire bench and contents are heated to 180°F. Remove the covering one hour after the steam has been cut. This allows the excess moisture to pass from the soil as vapor. Leach heavily immediately after sterilizing to reduce excess fertility.

Chemical Sterilization

A chemical which has proven its worth is Larvacide. This material must be used when the greenhouses are empty to avoid injury to adjoining crops. This gas is applied in liquid form with a special applicator so that 2 or 3 c. c. are applied at 10 inch centers. The soil should be moist before applying. A good suitable covering should be placed over the treated soil to keep the gas in the soil for at least 48 hours although a water seal applied 2 to 3 times every 24 hours will suffice. The soil temperature should be at least 60 degrees or higher. When used properly you can expect favorable control of insects, diseases and weed seeds.



Thomas Method of Steam Sterilization



Cane Stakes Used as Supports

Cultural Pointers

PLANTING

Chrysanthemums grow equally as well on a raised bench or on a ground bed. The care is slightly different in that raised benches dry out more frequently during the summer and early fall months. It must be remembered that a good circulation of air is desirable, yet a direct draft is not advisable.

Planting Date

The plants to be shaded should be planted seven weeks before the shading date in order that sufficient growth is made to give necessary height before black cloth is applied. For normal flowering all planting should be done in the month of June. The plants should be established in the soil three to four weeks before pinching.

Planting Rooted Cuttings

Many florists are planting rooted cuttings directly into permanent locations. This not only reduces several handlings and production costs, but also produces a better quality bloom. We fully realize that it is often an impossibility for all to treat their chrysanthemums this way. However, we have found that young, soft plants are superior to hard woody plants.

When planting rooted cuttings either into 2 $\frac{1}{4}$ " pots or directly into the bench, dip the tops of the cuttings, into a solution of **Fermate** 1 ounce to 4 gallons of water. This will establish the plants faster as well as protect the young plant from septoria leaf spot. If you plant in a cloth house or directly in the open be sure to add this to your must list.

Shading the Glass

When planting rooted cuttings into their permanent position it is necessary to shade the glass or to put aster cloth directly over the young plants until they are established. When shading the glass be sure that the material is applied lightly.

It is definitely advantageous to have some shade on the glass during the months of June and July when the light intensity is the highest. Cloth houses eliminate approximately one-third of the light and we all know what excellent results are obtained under this enclosure. Therefore, shading the glass lightly should likewise be beneficial. Remember not to allow the shade to remain on the glass too late in the season.

Distance of Planting

For good quality pompons we prefer to plant 7x8 inches or 8x8 inches pinched once, and thin the shoots to three per plant. The outside rows will support one more stem than the center rows in the bed. Nothing is gained by planting at a closer distance. Light intensity should be high at the base of the plant for quality blooms and if planted too close we have lost the factor which promotes quality. Large flowered varieties are generally planted 8x8 inches or 8x9 inches, this also applies to disbud anemone and single varieties.

Several growers have had success by planting two plants to a hill, spacing the hills 10x10 inches, pinching once and allowing six sprays per hill. This will require a few more plants but it is claimed that when planted further apart it is easier to spray and string. A higher production per square foot is obtained.

Knowledge of the varieties, date of benching as well as your method of growing will largely govern the distance of planting.



Chrysanthemums Tied with String

Cultural Pointers

FERTILIZERS

Soil structure is the key to soil fertility. The response of chrysanthemums to fertilization depends upon a favorable soil structure. It is known that plants require nutrients, water and air for growth. Good soil structure will provide proper air and water relationships. Therefore, it behooves us to give proper attention to the soil before starting the crop.

Feeding

Chrysanthemums do much better right from the start if the soil is not too rich. Very often this crop will start off faster in new soil as compared with old soil that has been sterilized just because of the lower nutrient level in the new soil. When using new soil, apply 3 to 5 lbs. of super phosphate per 100 sq. ft. of area, plus a liberal application of manure before planting. Phosphorus moves slowly within the soil mixture. It should always be added before the crop is benched so that it may be mixed thoroughly into the soil. Two to three applications of a complete fertilizer, such as Electra, made after the plants become established and until color shows will be adequate. Electra applied at the rate of 2 pounds per 100 sq. ft. of bed is sufficient. Never apply fertilizers to a dry soil. Water lightly first, then apply the proper quantity of fertilizer, then water heavily. Remember that the plant is the best guide as to fertilizer requirements and that more mums are ruined by over feeding than by nutrient deficiencies.

When using sterilized soil the best recommendations to follow would be to analyze your soil from time to time. We have found that when the following nutrient levels are kept, good crops are the result. Nitrate nitrogen should be 10 - 15 parts per million; phosphorus 2 - 5 parts per million; potassium 20 - 40 p.p.m. and calcium near 200 p.p.m. To increase the nitrate level feed one pound of ammonium sulfate per 100 sq. ft. of area, and to bring up the potassium apply muriate of potash not to exceed 1 lb. per 100 sq. ft.

In the cooler weather and shorter days of September omit the nitrogen if the plants are growing freely. The mum assimilates more phosphorus and potassium during the fall when temperatures decline. Therefore, it is more desirable to apply a complete fertilizer shortly after the buds are visible.

Excess or Soluble Salts

The foregoing pertains to plants that appear and behave normally. If plants are stunted, look yellow and sick, they are probably suffering from an extremely rich soil. Many greenhouse soils are excessively rich and chrysanthemums will not thrive in such a medium. If this is the case, the remedy is leaching with water. Lots and lots of it. Use more water than you ever applied to a bench before, two or three gallons per square foot. The water that runs through the soil carries with it the excessive plant food and allows your plants to recover from their indigestion. Did you ever notice fine healthy growth on a small part of a sick-looking bed of mums, and observe that it was under a broken pane of glass that allowed the rain water to come through and leach the soil below? Such a sight is a sure indication that the soil needed leaching. In most cases this condition is the result of the foolish and indiscriminate use of fertilizers. Use them when needed, but use them judiciously. Remember fertilizers are plant food in an extremely concentrated form.

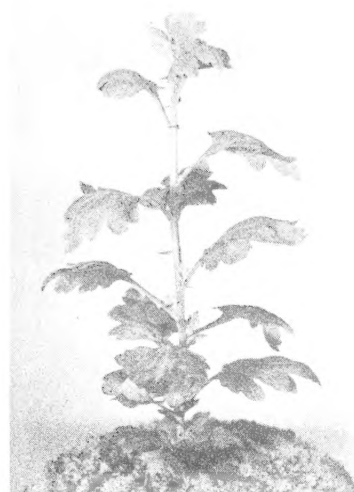
Mulches

A mulch of peat, rotted manure, ground corn cobs, alfalfa or red clover hay applied two to three weeks after planting will help maintain a uniform moisture in the soil and increase the growth. The strawy mulches should only be used when the nutrient level is high as the bacteria remove the nutrients from the soil to decompose the strawy mulch.



Use of Electra on Chrysanthemums

Cultural Pointers



Well Established Young Plant



Top Several Inches Removed



Strong Breaks Resulting from Single Pinch

PINCHING

For a good number of years the reason for pinching was to regulate the number of stems on the plant. In recent years we have learned that in case of pompons or singles the pinching determines the type of spray formation. With standards, pinching will determine the type of bud formation, whether it be a crown or terminal bud.

Time Pinching

The precision culture of chrysanthemums is all set-up around the "Last Pinch". To grow a quality pompon you should receive the rooted cuttings sometime in June and then plant into the permanent location approximately three to four weeks before the date listed in our list of varieties under "Last Pinch". When growing shaded pompons the "Last Pinch" should be 35 days before the shading date. Tall growing varieties such as Sea Gull, Rev. Bushnell should be pinched 28 days before shading. With standards under black cloth the majority of varieties should likewise be pinched 35 days before shading date.

Time pinching standards will eliminate the formation of the crown bud and produce terminal buds which will in turn produce a much straighter flowering stem.

All pinching should be finished by the early part of August as too late a pinching might encourage blindness and short stem length. We do feel that those people who grow their late flowering mums on ground beds should pinch about a week earlier than those on raised benches.

Pruning

Another important factor is to remove all shoots but 3 or 4 per plant, in a few instances only 2 shoots are allowed to mature. Allow more shoots to develop on the outside rows than on the center rows of a bed. When fewer breaks are selected the planting distance should be closer. If you prefer to have a number of smaller sprays, with fewer blooms open at one time, follow the double pinching procedure.

Standards are usually pinched once to induce breaks so that they may be grown two per plant. The strongest breaks are selected and all others removed. It is well to pinch on the date suggested in the general list. Careful observation has shown us that neckiness with some varieties is eliminated by pinching on the respective dates. Singles and anemones are usually grown 3 to 4 stems per plant.

Condition of Plant

When pinching, remove only the soft growth, never cut into the woody stems as this will not produce the type of breaks you desire. It is our experience that it is best not to pinch until the plant has become well established in its permanent location. In all cases it is better to have at least eight to ten inches of growth on the plants before pinching. (Photos above.)

When double pinching, pinch the first time 30 days before the "Last Pinch". This allows enough time to produce a growth long enough to pinch at the proper time.

If by chance you are delayed in planting and your plants will be too tall, it is advisable to pinch early enough before benching so that the breaks will be several inches long at time of planting. Never pinch hard plants at the same time they are planted into the bench, a heavy loss may result. Better wait until plants are established, then pinch.

The last pinching dates given after each variety will help you grow that variety to excellency. Remember that pinching is just one cultural factor and will only function when all other cultural points are carried out properly.

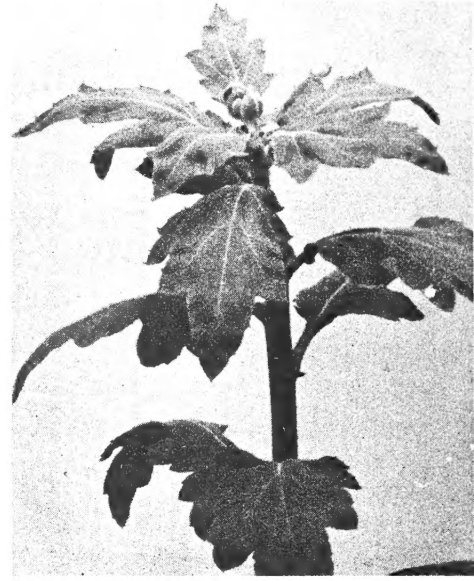
Cultural Pointers



Early or Crown bud surrounded by lateral buds



Late or Terminal bud surrounded by flower buds



Late or Terminal bud selected

DISBUDDING

Large flowered varieties produce side shoots in the axils of the leaves which should be removed very close to the base at regular weekly intervals. Disbuds are handled the same as standards.

Taking Bud

Taking bud means allowing the flowering bud to remain and removing all others, applies to standards and disbuds. The chrysanthemum usually produces two distinct types of flowering buds—Crown and Terminal. The first bud produced is called the crown bud and is distinguished by being surrounded by other lateral leaf buds. The second is the terminal bud and is surrounded by several flower buds. If the plant is planted especially early, a second crown bud might appear. In appearance this second crown bud is exactly the same as the first.

The procedure of "Taking Bud" depends very largely on the variety. Usually the safest rule to follow is not to select a bud on early or midseason varieties before August 25. In our list of large flowered varieties under "Select Bud" you will find the date on which to select the proper bud. If bud is selected too early a large percentage of the flowers will be crippled. Good common sense must be used to determine the proper selection of bud.

The formation of the crown bud usually does not take place when growing according to the "Time Pinch Plan". When following "Time Pinch" select the first bud that appears. This will result in straight stems without the dogleg growth that appears when second bud is taken.

The final selection of bud should not be made when the cluster buds are too small as this will very likely cause injury to the stem near the bloom. Likewise it is not advisable to delay selecting the bud too long. Some growers like to leave an alternate bud until they are certain that nothing will happen to the one finally selected.

DISBUDED SPRAYS

The procedure in growing disbudded sprays, is to wait until the crown bud forms, then remove all vegetative shoots but three. Later when terminal buds appear disbud each shoot similar to the normal disbudding of standards. When the blooms mature there are three flowers on each spray. In singles and anemones, the size of the blooms will be a trifle smaller than when they are grown as one flower per stem. Raise three stems per plant similar to straight disbud. Varieties such as Goldsmith, Valencia, etc., can be grown as disbudded sprays.

Good Chrysanthemums result from the careful and thorough practice of the basic principles of plant growth, plus the acknowledgment of certain differences in the nature of various varieties. Growing disbudded sprays is a modification in culture which is very much worthwhile.

Cultural Pointers

WATERING

The knowledge of proper watering is essential to success. Chrysanthemums produce extremely heavy foliage and a great deal of water is required at the roots, and under ordinary conditions of bench culture overwatering would be difficult. When grown in beds more care should be exercised in watering. After benching young plants grown in 2 1/4" pots, spot watering around the plants is more desirable than watering the entire area. When the plants become established the entire area should be given a thorough watering. A trowel should be used to examine the soil to determine the necessity of watering. Some soils look wet on the surface but are very dry several inches below.

When planting rooted cuttings directly into their permanent locations it is essential to water thoroughly to set the soil around the plant roots. We suggest double watering again when the soil gets on the dry side. By this time the plants are established and regular watering should be followed. Keep humidity in the house by wetting down bench and walks.

Surface Watering

During the past several years many labor saving devices have been developed. Surface watering is one that will save many hours of hand watering your chrysanthemum crop.

The Skinner Superior nozzle is the final answer to the exacting requirements of surface watering. An absolutely flat uniform spray is obtained over a full circle with a constant pattern under any pressure. This nozzle throws a fine spray 5 feet in diameter at 5 pounds pressure at the nozzle, and uses 0.9 gallons per minute.

When installing surface watering, check your water supply and the capacity needed to irrigate your area. It is advisable to have an engineer figure out your requirements.

Leaching

Many greenhouse soils are excessively rich and chrysanthemums will not thrive in such a medium. If this is the case, the remedy is leaching with water. After the soil is sterilized it should be leached. Use a skinner line and allow it to run for hours if necessary. Raised benches do not require as much water to leach.

Syringing

During the heat of the summer it is beneficial to syringe or spray the foliage of chrysanthemums. When syringing is started around 8:00 A.M. and continued at regular intervals, with the help of a light shade on the glass, the house temperature can be kept down and the humidity raised within the house. When the growth becomes thick or when the nights get chilly discontinue all syringing. Some growers who grow quality mums tell us that they do not syringe their crop during the entire season.



Superior Nozzle Showing Uniformity of Pattern

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Cornell Standard Weight Grading (CSW)

During the past year Dr. Kenneth Post of Cornell University advocated the use of weight in grading pompons. Quality in cut flowers is best expressed by weight. The weight of an individual stem accounts for the size and length of stem. Weight cannot take into account color, crooked stems, old or misshapen flowers. These poor flowers are easily eliminated from the graded stock by the sorter.

Pompons are doubtless in the greatest disorder of any flower in the market. Nothing is standard at present. The trouble is due to no standard grading and bunching practice. Some growers bunch on the basis of weight per bunch. They may bunch 7, 9, 10, 12, or 24 ounces together. When prices increase the size of bunch decreases and when prices decrease the size of bunch increases.

Pompons grade easily by weight per stem.

Pompon Grades				
CSW Grade	Stems Per Package	Weight Per Stem (Ounces)	Weight Per Pack (Ounces)	Stem Length (Inches)
Special	1/4 Dozen	2 1/2 or more	9 or more	24-36
Fancy	1/2 Dozen	1 1/2 to 2 1/2	9 — 12	20-30
Extra	1/2 Dozen	1 to 1 1/2	6 to 9	20-30
First	1 Dozen	1/2 to 1	6 to 9	less than 20

Utility packed to correspond with above.

The weight is with the foliage turgid, but no free water on the stems or leaves and the lower 1/3 of the foliage removed. To grade above Utility the stems must be reasonably straight and the foliage and flowers free from insect, disease or other objectionable injuries. The presence of such injuries places them in the utility grade.

The stems should be straight and the flowers mature, but not over-ripe. Stem length should correspond with the grade and be proper for the market. The stems should be cut of the same length within a bunch. Most of the weight of pompons is in the flowers. Weight per stem accounts more for the flowers than for the stem.

This is a step in the right direction. It is true that modifications will be forthcoming but it is worth a trial.



Wrapping Pompons in Parchment Paper



Wrapped Pompons Packed for Shipment

Cultural Pointers

TEMPERATURE

This crop will make its most growth during cool weather. During the summer, syringing overhead plus a light shade on the glass will help keep the plants cool.

Blindness

Blindness may be a combination of late planting, late pinching, too much moisture, too rich a soil and too low a temperature at bud initiation. It has been shown that if chrysanthemums are grown in temperatures much below 50° at the time of bud initiation the plants will remain vegetative and will not form flower buds. Blindness is usually associated with those varieties which flower the latter part of November or later. Not all varieties initiate buds at the same date. The late flowering varieties may not set bud until October.

To overcome blind growth keep a night temperature of 55 - 60° from September 15 on until the buds are visible. Likewise run the soil moisture low and do not feed during this period. After the buds are visible it is safe to reduce the temperature to 50°.

When growing chrysanthemums "The Year Around" it is very important to maintain a temperature of 60° during the period of bud formation or blindness and poor budding will result.

SHIPPING FLOWERS

Packing of cut flowers should be carefully studied. The most common error is over-crowding in the shipping boxes. Not securely fastening the blooms in the box will cause bruising of the petals. Cleating or sewing the stems to the box is essential. Cushion the blooms by placing enough padded paper on the bottom of the corrugated box and between the layers of blooms. Wrap the pompons with a loose wrapper. The wrapping paper could have the name of the grower printed on it.

Long distance shipments carry better if the cut flowers are packed dry. Reduction of temperature is accomplished by precooling the packed cut flowers.

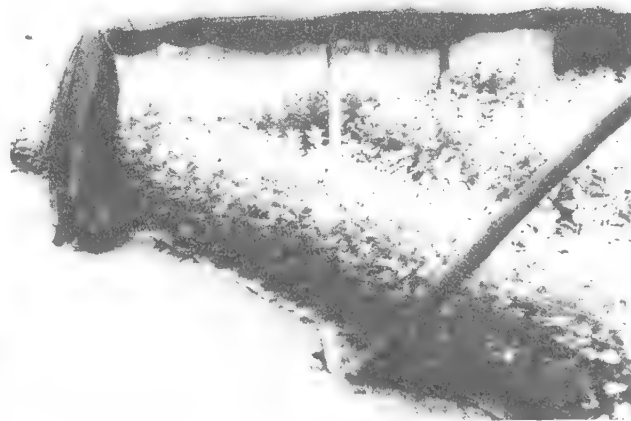
CULTURED STOCK

Through the development of science your chrysanthemum cuttings have all been grown from stock that has been cultured to determine the presence or absence of the fungus that causes Verticillium Wilt or more commonly referred to as Seidewitz Disease. The culturing of cutting is to place bits of the stem of a cutting into the gelatine-like agar medium which is used for growing fungi. If the tissue is not infected, no growth of Verticillium develops. As each cutting is cultured it is placed in sterile propagating benches spaced six inches each way. After 10 days of incubating the agar plates one can determine if the wilt organism is present in the tissue. All the cuttings that show the presence of Verticillium are discarded and only those that show a negative reading are saved and grown into stock plants. This clean stock must be grown under sterile conditions at all times as cuttings can be easily contaminated when planted into soil that has the Verticillium organism present.

Verticillium wilt is one of the worst diseases of the Chrysanthemum. If you obtain cuttings propagated from cultured stock and provided you grow your plants in clean soil this disease should not be of any trouble to you.



Paper Mulch on Mums Before Planting



Cross Supports Held in Place by Patent Clothespins

Cultural Pointers

SUPPORTS

Standards and disbuds are usually staked up by means of a support, starting when the plants are a foot high. The simplest method is to run a wire overhead, along each row and tie a string from the base of the plant to this wire. This method eliminates the need of tying the stem at intervals to the support since the string may be twined in and out of the leaves of the stem. The quickest means of support is the use of galvanized wire stakes, which are fastened by patented clips to the wire overhead. Several string ties are necessary to keep the stem in position. In some cases the same type of support that is used in supporting carnations with wire and string has been used satisfactorily.

Pompons are usually supported by the string and wire method similar to that used for snapdragons and carnations. Two layers of wires are necessary to give the pompons good support. When growing out of doors or in cloth houses heavier wire is necessary to give proper support because moisture often collects in the open blooms accounting for the extra weight requiring very strong supports.

CLEANING SPRAY EQUIPMENT

For efficiency of all mechanical items cleanliness is the final word. To avoid contamination and reducing the effectiveness of spray materials keep your sprayer and hose lines clean. After each spraying clean out the sprayer with hot water and allow to run through the pump and hose line. It is best to empty the sprayer after you are through spraying as many materials change chemically if allowed to stand in the sprayer.

Scum deposits are frequently found in sprayers and to remove, add 1 pound of tri-sodium phosphate to 25 gallons of hot water and allow the solution to run through the tank into the hose and back into the tank for 30 to 40 minutes. Empty out the tri-sodium phosphate solution and run clean water through the spray to remove the cleaner. Do this every two or three months depending on the condition of the sprayer.

This picture shows average sprays used on

CORNELL STANDARD WEIGHT GRADES

- 1 *Special*
- 2 *Fancy*
- 3 *Extra*
- 4 *First*

Details on CSW grades will be found on Page 8.



Extending the Chrysanthemum Season a Short Period by the Use of Lights

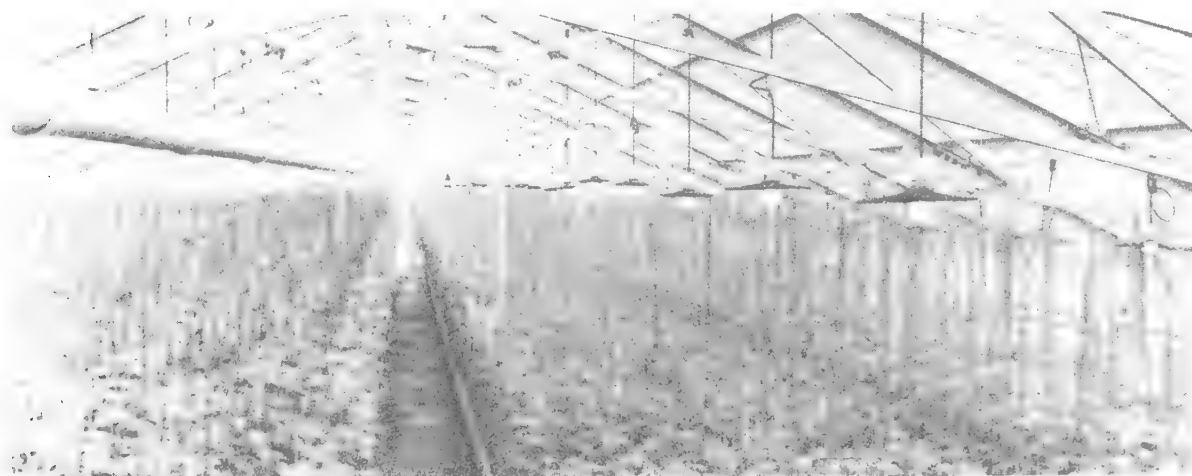
To produce high quality standards and singles for the Christmas season it is necessary to grow some of the better November flowering varieties under light to retard blooming. Some growers have made a specialty of producing a quality crop to mature at Christmas or later. Growers in Texas and other southern states find that a short delay in flowering will bring their crop in when they can compete with crops grown in the open in California.

Best results were obtained when the plants were lighted nightly, beginning 2 weeks before the first visible buds. If it is desired to extend the blooming season for short periods of a few weeks, then the light-exposure period each night can be short, not to exceed 60 minutes of light from 40- to 60-watt bulbs spaced 4 to 5 feet apart and 4 feet above the bench. If the blooming season is to be extended further, a longer period of light should be used.

The lights should be discontinued according to the blooming time desired. November 1 to 15 flowering varieties will require 9 weeks after the lights are stopped until blooming, November 15 to 30 flowering varieties require 10 to 11 weeks and those blooming in December, 11 to 12 weeks, depending somewhat upon the temperature maintained in the greenhouse.

USEFUL HINTS

- 1—Select vigorous growing midseason to late-flowering varieties for delayed flowering, such as Indianapolis White, Pink, Bronze and Yellow, Dark Pink Orchid Queen, Orchid Queen, Yellow Queen, Jean Elizabeth, Valencia and its sports.
- 2—Planting date may be several weeks later than when no lights are used. Plant two plants per hill, pinch pompons once and grow three stems per plant.
- 3—Light with 40- to 60-watt lamps using suitable reflectors hung at four-foot intervals over the bench. Too low a light intensity will not retard bud development.
- 4—Start lights at least 2 weeks before buds are normally visible for the variety, usually not later than August 10th. Starting after this date may cause malformed flowers and long necks.
- 5—Use lights EVERY NIGHT at or near midnight, for one hour, when blooming is to be delayed several weeks. Use lights three hours for delaying longer periods.
- 6—Pinch pompoms and disbuds the last time 35 days before the light treatment is discontinued. This will prevent varieties from getting too leggy.
- 7—Night temperatures should be 55 degrees with day temperatures from 10 to 15 degrees higher. Cooler night temperatures will induce blindness.



Proper Lighting For Delayed Flowering

Spring Flowered Chrysanthemums

Chrysanthemums can be produced at any time of year, providing day length, temperature, insects and diseases are controlled correctly. Our research workers in various federal and state institutions have shown us that chrysanthemums can be flowered the year around. The chrysanthemum has great variety of colors and types and also has excellent keeping quality. Both the retailer and consumer are interested in this and they will welcome the addition of chrysanthemums the year around. Season has been eliminated and the flowering time can be accurately controlled. You can use varieties that are best for your market. Some varieties are excellent for the August to November bloom but are worthless during the winter and spring months because of the poor light intensity at that time.

Daylength Control

It has been known that the days are short enough for bud formation around September 20. This will vary somewhat depending upon your location in the States. To prevent flower buds from forming it is desirable to lengthen the day with additional light starting August 10. When one is using black cloth to reduce the length of the day the treatment can be discontinued September 20. Similarly in the spring the days are too long for further bud formation starting April 15. To prevent bud formation light the plants until April 20. If you want bud formation start shading March 15, or a little earlier if you are in the extreme southern states.

Black Cloth

If you are using black cloth during the period from March 15 to July 25 be sure to have opaque cloth so that very little light passes through the cloth. Cloth that has been previously used very likely will not be dark enough, so make tests with a light meter before using. Heavy canvas dyed a dark color has proven to be satisfactory. Shade until color shows on all buds.

Amount of Additional Light

The use of 100 watt lamps with reflectors spaced at six foot intervals, three feet above the plants, is sufficient light to prohibit bud formation. Light should be applied from midnight to 12:30 a.m. from August 10 to September 1 and February 15 to April 15. During the period from September 1 to February 15 it is necessary to use four hours of additional illumination from midnight to 4:00 a.m. or if convenient from 6:00 p.m. to 10:00 p.m. each evening. The light intensity must be 10-foot candles to prevent bud set.

Temperature Control

For bud formation a minimum temperature of 60-65 degrees should be maintained. During the period of elongation or where bud formation is not wanted a night temperature near 60 degrees is ideal. When black cloth is started raise the night temperature to 60 degrees until color shows, and then it can be lowered.

When growing a single bench of pompons in a cool house it has been a problem how to increase the temperature necessary for bud set. A simple method is when applying black cloth allow the cloth to drop to the floor on each side of the bench. Turn on the heat lines under that bench and you will find that a 60 to 65 degree temperature can be maintained.

Timing

Rooted cuttings previously grown under additional light should be planted directly into the permanent location and pinched 21 days later. A soft pinch should be made. The period of elongation or the period which must have additional light will vary with the planting date. October planted cuttings will require a longer period to attain their desired height as compared with February planted cuttings. Therefore, we have added a schedule of spring flowering chrysanthemums. In this schedule you will find the date of planting, the date of pinch, which in all cases is 21 days after planting. The date the lights should be off as well as the shading date are found in this schedule. Remember to apply additional light from the day you plant until the respective date given under the heading **Lights Off**.

Varieties

At present the pompon, single and anemone spray type varieties respond the best. Standards often times mature with poor flower heads. The pompon varieties will also net you a greater return. The varieties found in the schedule are the best for the respective flowering periods.

Schedule of Spring Flowering Chrysanthemums

Variety	Plant	Pinch	Lights Off	Shade	Bloom
GOLD COAST GOLDEN HERALD YELLOW ARCADIA PINOCCHIO ARCADIA PINK DOT	October 15	November 7	December 28	-----	March 15 - 31
GOLD COAST GOLDEN HERALD YELLOW ARCADIA PINOCCHIO ARCADIA PINK DOT	November 15	December 5	January 15	-----	April 1 - 15
GOLD COAST GOLDEN HERALD YELLOW ARCADIA PINOCCHIO ARCADIA PINK DOT	December 2	December 26	February 5	March 15	} April 15 - 30
BARCAROLE LITTLE AMERICA WHITE MENSA SHASTA MASTERPIECE BR. MASTERPIECE	November 20	December 10	January 20	March 15	
GOLD COAST GOLDEN HERALD YELLOW ARCADIA PINOCCHIO ARCADIA PINK DOT	December 20	January 10	February 25	March 15	} May 1 - 15
BARCAROLE LITTLE AMERICA WHITE MENSA SHASTA MASTERPIECE BR. MASTERPIECE	December 5	December 26	February 10	March 15	
GOLD COAST GOLDEN HERALD YELLOW ARCADIA PINOCCHIO ARCADIA PINK DOT	January 10	February 1	March 12	March 15	} May 15 - 31
BARCAROLE LITTLE AMERICA WHITE MENSA SHASTA MASTERPIECE CASSANDRA BR. MASTERPIECE	January 1	January 20	March 1	March 15	

REMEMBER TO APPLY ADDITIONAL LIGHT FROM THE DAY YOU PLANT UNTIL THE RESPECTIVE DATE GIVEN UNDER THE HEADING *LIGHTS OFF*.

Schedule of Spring Flowering Chrysanthemums

Variety	Plant	Pinch	Lights Off	Shade	Bloom	
GOLD COAST GOLDEN HERALD YELLOW ARCADIA PINOCCHIO ARCADIA PINK DOT	February 1	February 20	March 30	March 30	} June 1 - 15	
BARCAROLE LITTLE AMERICA WHITE MENSA SHASTA MASTERPIECE CASSANDRA BR. MASTERPIECE						January 15
GOLD COAST GOLDEN HERALD YELLOW ARCADIA PINOCCHIO ARCADIA PINK DOT	February 15	March 6	April 12	April 12		} June 15 - 30
BARCAROLE LITTLE AMERICA WHITE MENSA SHASTA MASTERPIECE CASSANDRA BR. MASTERPIECE	February 1	February 20	March 28	March 28		

USEFUL HINTS IN GROWING SPRING FLOWERED CHRYSANTHEMUMS

1. Cuttings must be taken from lighted stock plants.
2. Light intensity should be 10 foot candles or more to prevent bud set.
3. The lights should be applied each evening without fail.
4. Black cloth should be applied March 15 on until the color shows.
5. The night temperature at the time of bud set must be 60 - 65 degrees.
6. Keep the night temperature at 60 degrees from the date of planting.

REMEMBER TO APPLY ADDITIONAL LIGHT FROM THE DAY YOU PLANT UNTIL THE RESPECTIVE DATE GIVEN UNDER THE HEADING LIGHTS OFF.

The Use of Black Cloth Shading to Advance the Flowering Season

The commercial use of applying black cloth to advance the flowering season has been used successfully for the past eighteen years. The biggest change has not been in the application of the cloth but has come about with varieties and their culture. The varieties in the following list lend themselves to black cloth shading. The dates opposite the varieties are found satisfactory when the given blooming date is desired.

USEFUL HINTS

- 1—Use a good durable **Black Cloth** which when applied will reduce the light intensity to 2 foot candles or less. More light intensity than this will result in delayed flowering and unevenness of bloom.
- 2—Plants should be planted 7 weeks before shading date. The Last Pinch should be 35 days before shading date. With some varieties, such as *Cassandra* and *Sea Gull* pinch 28 days before shading date. This will make for a better spray formation. Pinch the standards 35 days before shading date. Remember the plants should always be in a very active growing condition when following these suggestions.
- 3—The cloth should be applied at 5 P.M. and removed at 8 A.M. Continue covering each evening on pompons until the latest buds show color and most of the flowers are well developed. For large flowering varieties shading can be discontinued after all flowering buds have attained the diameter of approximately one half inch.
- 4—Be sure that covering is complete on all benches shaded, as any leaks in light will cause uneven spots in the bench at blooming time.
- 5—When shading out of doors or under aster cloth, it has been found that metal clamps similar to those used in battery shops will hold on the black cloth better than clothes pins or safety pins.
- 6—When growing large flowering varieties outdoors give some protection as rain and wind storms play havoc when not protected.
- 7—Best results are obtained when varieties of approximately the same blooming date are used for any one particular shading. When a spread in blooming dates is desired, repeated shading of a few varieties at weekly or ten-day intervals has proven more satisfactory than grouping a large number of varieties into any one shading. The shading dates given are those which have been found to be best for the respective varieties. We recommend benching seven weeks prior to shading.
- 8—Continue to give the plants which are being given the short day treatment the same care as those grown normally. We have collected the data on the ideal time to bench and pinch for the respective dates of bloom when shading is started at various dates. This is found in the tables on the following pages.
- 9—Select the first bud on standard varieties that appears after shading is started.
- 10—Black cloth should be applied each evening although missing one night a week will give fair results but delayed flowering results when cloth is not applied each evening.

As an added suggestion, we would recommend the removal of black cloth after night fall to allow for a better circulation of air. This would prevent the accumulation of dampness and the unfavorable results that usually occur therefrom. This of course will cause considerable extra work as the cloth must be replaced before morning. We feel however, that as this will improve the growth and the foliage it will be well worth the effort. Perfection is never obtained without added effort.

Large Flowering Varieties

Variety	Color	Date of Planting	Date of Last Pinch	Shade	Bloom
BLAZING GOLD	Yellow	April 23	May 14	June 27	} August 20 — September 1
GOOD NEWS	Yellow	April 23	May 14	June 21	
SILVER SHEEN	White	April 23	May 14	June 27	
BETSY ROSS	White	April 23	May 14	June 21	
PINK CHIEF	Pink	April 23	May 14	June 27	
DETROIT NEWS	Bronze	April 23	May 14	June 21	
BLAZING GOLD	Yellow	May 4	May 25	July 6	} September 1 - 10
GOOD NEWS	Yellow	May 4	May 25	July 1	
INDIANAPOLIS YELLOW	Yellow	May 1	May 21	June 25	
SILVER SHEEN	White	May 4	May 25	July 6	
BETSY ROSS	White	May 4	May 25	July 1	
INDIANAPOLIS WHITE	White	May 1	May 21	June 25	
PINK CHIEF	Pink	May 4	May 25	July 6	
INDIANAPOLIS PINK	Pink	May 1	May 21	June 25	
DETROIT NEWS	Bronze	May 4	May 25	July 1	
INDIANAPOLIS BRONZE	Bronze	May 1	May 21	June 25	
BLAZING GOLD	Yellow	May 14	June 4	July 16	} September 10 - 20
GOOD NEWS	Yellow	May 14	June 4	July 11	
INDIANAPOLIS YELLOW	Yellow	May 10	June 1	July 6	
SILVER SHEEN	White	May 14	June 4	July 16	
BETSY ROSS	White	May 14	June 4	July 11	
INDIANAPOLIS WHITE	White	May 10	June 1	July 6	
PINK CHIEF	Pink	May 14	June 4	July 16	
INDIANAPOLIS PINK	Pink	May 10	June 1	July 6	
DETROIT NEWS	Bronze	May 14	June 4	July 11	
INDIANAPOLIS BRONZE	Bronze	May 10	June 1	July 6	
GOOD NEWS	Yellow	May 24	June 14	July 21	} September 20 — October 1
INDIANAPOLIS YELLOW	Yellow	May 20	June 10	July 16	
YELLOW MEFO	Yellow	May 14	June 1	July 11	
BETSY ROSS	White	May 24	June 14	July 21	
INDIANAPOLIS WHITE	White	May 20	June 10	July 16	
MEFO	White	May 14	June 1	July 11	
INDIANAPOLIS PINK	Pink	May 20	June 10	July 16	
DK. PK. ORCHID QUEEN	Pink	May 14	June 1	July 11	
DETROIT NEWS	Bronze	May 24	June 14	July 21	
INDIANAPOLIS BRONZE	Bronze	May 20	June 10	July 16	
GOOD NEWS	Yellow	June 3	June 24	July 31	} October 1 - 10
INDIANAPOLIS YELLOW	Yellow	May 31	June 20	July 26	
YELLOW QUEEN	Yellow	May 25	June 11	July 21	
BETSY ROSS	White	June 3	June 24	July 31	
INDIANAPOLIS WHITE	White	May 31	June 20	July 26	
MEFO	White	May 25	June 11	July 21	
INDIANAPOLIS PINK	Pink	May 31	June 20	July 26	
DK. PK. ORCHID QUEEN	Pink	May 25	June 11	July 21	
DETROIT NEWS	Bronze	June 3	June 24	July 31	
INDIANAPOLIS BRONZE	Bronze	May 31	June 20	July 26	
GOOD NEWS	Yellow	June 13	July 5	August 10	} October 10 - 20
INDIANAPOLIS YELLOW	Yellow	June 10	July 1	August 5	
YELLOW QUEEN	Yellow	June 5	June 26	August 1	
BETSY ROSS	White	June 13	July 5	August 10	
INDIANAPOLIS WHITE	White	June 10	July 1	August 5	
MEFO	White	June 5	June 26	August 1	
INDIANAPOLIS PINK	Pink	June 10	July 1	August 5	
DK. PK. ORCHID QUEEN	Pink	June 5	June 26	August 1	
DETROIT NEWS	Bronze	June 13	July 5	August 10	
INDIANAPOLIS BRONZE	Bronze	June 10	July 1	August 5	

Pompons, Decorative, Single and Anemone Types

Variety	Color	Date of Planting	Date of Last Pinch	Shade	Bloom
GOLD COAST	Yellow	April 2	April 30	June 1	} August 1 - 10
IRENE	White	April 2	April 23	June 6	
PINOCCHIO	White	April 2	April 23	June 1	
GOLD COAST	Yellow	April 13	May 11	June 11	} August 10 - 20
IRENE	White	April 13	May 4	June 17	
PINOCCHIO	White	April 13	May 4	June 11	
GOLD COAST	Yellow	April 23	May 21	June 21	} August 20— September 1
IRENE	White	April 23	May 14	June 27	
PINOCCHIO	White	April 23	May 14	June 21	
COTTON TOP	White	April 23	May 14	June 21	
MINONG	White	April 23	May 14	June 21	
ARCADIA	White	April 23	May 14	June 21	
GOLD COAST	Yellow	May 4	May 25	July 1	} September 1 - 10
YELLOW DOT	Yellow	May 4	May 25	July 1	
YELLOW ARCADIA	Yellow	May 4	May 25	July 1	
BARCAROLE	Yellow	May 1	May 21	June 25	
SUNRAY	Yellow	May 1	May 21	June 25	
IRENE	White	May 4	May 25	July 6	
PINOCCHIO	White	May 4	May 25	July 1	
COTTON TOP	White	May 4	May 25	July 1	
MINONG	White	May 4	May 25	July 1	
ARCADIA	White	May 4	May 25	July 1	
SEA GULL	White	May 4	June 3	July 1	
REV. BUSHNELL	White	May 1	May 28	June 25	
FIREBIRD	Bronze	May 4	May 25	July 1	
SENECA	Bronze	May 4	May 25	July 1	
RED DAISY	Red	May 4	May 25	July 1	
NAVAHO	Red	May 1	May 21	June 25	
CASSANDRA	Bronze	May 1	May 28	June 25	
JEWELL	Pink	May 4	May 25	July 6	
MARY McARTHUR	Pink	May 4	May 25	July 1	
PINK DOT	Pink	May 4	May 25	July 1	
JESSIE	Pink	May 4	May 25	July 1	
CAROLINE YOSICK	Pink	May 4	May 25	July 1	
OCTOBER PINK	Pink	May 4	May 25	July 1	
DARK PINK BULKELEY	Pink	May 1	May 28	June 25	
GOLD COAST	Yellow	May 14	June 11	July 11	} September 10 - 20
YELLOW DOT	Yellow	May 14	June 4	July 11	
YELLOW ARCADIA	Yellow	May 14	June 4	July 11	
BARCAROLE	Yellow	May 10	June 1	July 6	
NUGGETS	Yellow	May 10	June 1	July 6	
SUNRAY	Yellow	May 10	June 1	July 6	
YELLOW FELLOW	Yellow	May 10	June 1	July 6	
PINOCCHIO	White	May 14	June 4	July 11	
COTTON TOP	White	May 14	June 4	July 11	
MINONG	White	May 14	June 4	July 11	
ARCADIA	White	May 14	June 4	July 11	
SEA GULL	White	May 14	June 13	July 11	
REV. BUSHNELL	White	May 10	June 8	July 6	
FIREBIRD	Bronze	May 14	June 4	July 11	
RED DAISY	Red	May 14	June 4	July 11	
SENECA	Bronze	May 14	June 4	July 11	
NAVAHO	Red	May 10	June 1	July 6	
CASSANDRA	Bronze	May 14	June 8	July 6	
MARY McARTHUR	Pink	May 14	June 4	July 11	
PINK DOT	Pink	May 14	June 4	July 11	
JESSIE	Pink	May 14	June 4	July 11	

Pompons, Decorative, Single and Anemone Types

Variety	Color	Date of Planting	Date of Last Pinch	Shade	Bloom
CAROLINE YOSICK	Pink	May 14	June 4	July 11	} September 10 - 20
OCT. PINK	Pink	May 14	June 4	July 11	
DARK PINK BULKELEY	Pink	May 10	June 8	July 6	
GOLD COAST	Yellow	May 24	June 21	July 21	} September 20 — October 1
BARCAROLE	Yellow	May 20	June 10	July 16	
NUGGETS	Yellow	May 20	June 10	July 16	
SUNRAY	Yellow	May 20	June 10	July 16	
YELLOW FELLOW	Yellow	May 14	June 1	July 11	
PRINCETON	Yellow	May 14	June 8	July 11	
PINOCCHIO	White	May 24	June 14	July 21	
COTTON TOP	White	May 24	June 14	July 21	
SEA GULL	White	May 24	June 23	July 21	
REV. BUSHNELL	White	May 20	June 18	July 16	
VESPER	White	May 14	June 8	July 11	
LITTLE AMERICA	White	May 14	June 1	July 11	
RED DAISY	Red	May 24	June 14	July 21	
NAVAHO	Red	May 20	June 10	July 16	
CASSANDRA	Bronze	May 20	June 18	July 16	
BR. MASTERPIECE	Bronze	May 20	June 14	July 21	
RED PRINCETON	Red	May 14	June 8	July 11	
BITTERSWEET	Red	May 24	June 21	July 21	
PINK DOT	Pink	May 24	June 14	July 21	
MARY McARTHUR	Pink	May 24	June 14	July 21	
JESSIE	Pink	May 24	June 14	July 21	
CAROLINE YOSICK	Pink	May 24	June 14	July 21	
OCT. PINK	Pink	May 24	June 14	July 21	
DARK PINK BULKELEY	Pink	May 20	June 18	July 16	
MASTERPIECE	Pink	May 20	June 10	July 16	
GOLD COAST	Yellow	June 3	June 30	July 31	} October 1 - 10
BARCAROLE	Yellow	May 31	June 20	July 26	
NUGGETS	Yellow	May 31	June 20	July 26	
SUNRAY	Yellow	May 31	June 20	July 26	
YELLOW FELLOW	Yellow	May 25	June 11	July 21	
PRINCETON	Yellow	May 25	June 18	July 21	
PINOCCHIO	White	June 3	June 24	July 31	
COTTON TOP	White	June 3	June 24	July 31	
SEA GULL	White	June 3	June 3	July 31	
REV. BUSHNELL	White	May 31	June 28	July 26	
VESPER	White	May 25	June 18	July 21	
LITTLE AMERICA	White	May 25	June 11	July 21	
NAVAHO	Red	May 31	June 20	July 26	
CASSANDRA	Bronze	May 31	June 28	July 26	
SENECA	Bronze	June 3	June 24	July 31	
BR. MASTERPIECE	Bronze	May 31	June 20	July 26	
RED PRINCETON	Red	May 25	June 18	July 21	
BITTERSWEET	Red	May 31	June 28	July 26	
PINK DOT	Pink	June 3	June 24	July 31	
MARY McARTHUR	Pink	June 3	June 24	July 31	
CAROLINE YOSICK	Pink	June 3	June 24	July 31	
OCT. PINK	Pink	June 3	June 24	July 31	
DARK PINK BULKELEY	Pink	May 31	June 28	July 26	
MASTERPIECE	Pink	May 31	June 20	July 26	

Pompons, Decorative, Single and Anemone Types

Variety	Color	Date of Planting	Date of Last Pinch	Shade	Bloom
GOLD COAST	Yellow	June 13	July 12	August 10	} October 10 - 20
BARCAROLE	Yellow	June 10	July 1	August 5	
NUGGETS	Yellow	June 10	July 1	August 5	
SUNRAY	Yellow	June 10	July 1	August 5	
YELLOW FELLOW	Yellow	June 5	June 26	August 1	
PRINCETON	Yellow	June 5	July 3	August 1	
PINOCCHIO	White	June 13	July 5	August 10	
COTTON TOP	White	June 13	July 5	August 10	
SEA GULL	White	June 13	July 13	August 10	
REV. BUSHNELL	White	June 10	July 8	August 5	
VESPER	White	June 5	July 3	August 1	
LITTLE AMERICA	White	June 5	June 26	August 1	
NAVAHO	Red	June 10	July 1	August 5	
CASSANDRA	Bronze	June 10	July 8	August 5	
SENECA	Bronze	June 13	July 5	August 10	
BR. MASTERPIECE	Bronze	June 10	July 1	August 5	
RED PRINCETON	Red	June 5	July 3	August 1	
BITTERSWEET	Red	June 10	July 8	August 5	
PINK DOT	Pink	June 13	July 5	August 10	
MARY McARTHUR	Pink	June 13	July 5	August 10	
CAROLINE YOSICK	Pink	June 13	July 5	August 10	
OCT. PINK	Pink	June 13	July 5	August 10	
DARK PINK BULKELEY	Pink	June 10	July 8	August 5	
MASTERPIECE	Pink	June 10	July 1	August 5	



Black Cloth Rolled Back Over Beds of Shaded Pompons.

Chrysanthemum Pot Plant Culture

Well grown short pot plants of Chrysanthemums have been finding a ready market in various sections of the country. We feel that many growers have been neglecting this valuable Fall potted plant. In many cases, poor attempts have been made in growing this plant and we offer the following suggestions for your consideration:

Planting

Cuttings may be planted into 2½" pots in May and later shifted into the larger pot for finishing. If this is done care must be used so as not to get the plants hardened too much before shifting. A more efficient and easier way is to set the large pots on the bench, fill them with potting soil and plant the cuttings directly into the finishing pots.

Three cuttings should be planted in a six inch pot while four may be required for a large pot.

Watering and Humidity

After planting, water thoroughly to set the soil around the plant roots. Repeat this type of watering when the soil gets on the dry side. Organic matter in the soil will facilitate watering and will tend to avoid extreme fluctuations in moisture supply. Keep humidity in house by wetting down bench and walks.

Pinching

Three pinches are sufficient for a good short compact pot plant. The first pinch should be approximately 15 days after planting. The second pinch about 30 days after planting and the third and last pinch as listed on the chart. Some of the varieties listed grow taller than others, however by observing the last pinching date all the varieties listed should finish reasonably uniform in height.

Fertilizing

The best program is to have regular soil tests and feed as need is indicated by these tests. In absence of these facilities, and starting with a relatively fertile potting soil, several light feedings should be made with a complete fertilizer such as Electra. This can safely be used at the rate of 1 Teaspoonful per 6" pot. This should be applied when soil is moist and never on a dry soil.

The foliage should retain a bright green lustre throughout the life of the plant, and the lower leaves should never be allowed to lose their color and turn to a light green due to low fertility. A strong well grown pot plant is a well fed plant.

Diseases and Insects

Pot plants should be sprayed regularly with one of the rotenone insecticides for control of red spider. Pyrethrum sprays or **Deenate 50W** will control thrip and leaf tyer. If plants are to be grown outdoors before final potting the foliage should be kept covered with a spray such as Bordeaux Mixture or Fermate to prevent leaf spot. If this is not done considerable foliage loss may result during wet cool weather.

Shading

Same procedure as for cut flowers. Black cloth should be new or in best of condition for very early shadings to avoid delayed and uneven blooming. When possible take cloth off at night, replacing before daylight. Pinch pot plant varieties the last time the date shading is started.

Pot Plants in 60 Days

Plant four to six vigorous rooted cuttings directly in a 6 inch pot and 60 days later the plant will be in full bloom. The cuttings should be from lighted stock. The potted cuttings are given short days immediately. The plant is not pinched but grown in a 60 degree temperature.

Cuttings planted from September 1 to February 1 will require no lighting or black cloth treatment. The nights are short enough to produce flowering. Plants growing from March 1 to September 1 will require short day treatment.

Pot Plant Culture Continuous Blooming Schedule

YELLOW

Planting Date	Shading Date	Blooming Date
GOLD LODGE		
May 15	July 1	August 28
June 1	July 15	September 11
June 15	August 1	September 28
July 1	None	October 10
BLAZING GOLD		
May 15	July 1	September 1
June 1	July 15	September 15
June 15	August 1	October 1
July 1	None	October 25
YELLOW BEAUTY		
May 15	July 1	September 7
June 1	July 15	September 21
June 15	August 1	October 8
July 1	None	November 10
BONNAFFON DE LUXE		
May 15	July 1	September 15
June 1	July 15	September 29
June 15	August 1	October 15
July 1	None	November 20
SUN GOLD		
May 15	July 1	September 19
June 1	July 15	October 3
June 15	August 1	October 20
July 1	None	November 25

WHITE

GRANITE STATE		
May 15	July 1	September 1
June 1	July 15	September 15
June 15	August 1	October 1
July 1	None	October 25
RICHARD MANDEL		
May 15	July 1	September 7
June 1	July 15	September 21
June 15	August 1	October 8
July 1	None	November 10
LITTLE AMERICA		
May 15	July 1	September 7
June 1	July 15	September 21
June 15	August 1	October 8
July 1	None	November 10
MARKETEER		
May 15	July 1	September 14
June 1	July 15	September 28
June 15	August 1	October 14
July 1	None	November 18

BRONZE

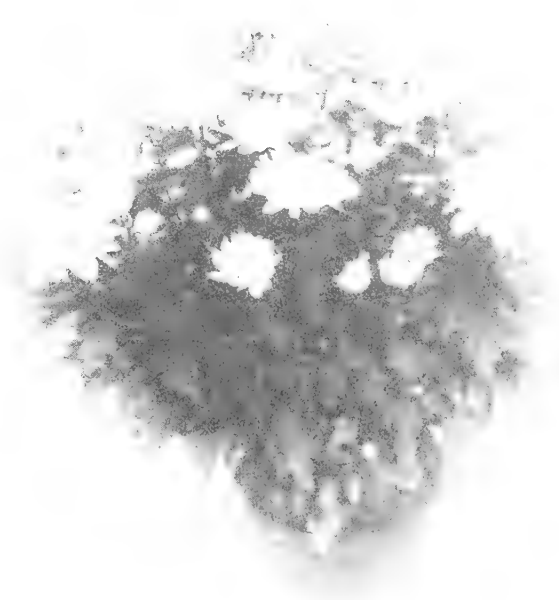
BRONZE MASTERPIECE		
May 15	July 1	September 11
June 1	July 15	September 25
June 15	August 1	October 12
July 1	None	November 15

BRONZE

Planting Date	Shading Date	Blooming Date
GYPSY		
May 15	July 1	September 11
June 1	July 15	September 25
June 15	August 1	October 12
July 1	None	November 15

PINK

THYRA		
May 15	July 1	September 7
June 1	July 15	September 21
June 15	August 1	October 8
July 1	None	November 10
QUEEN OF PINKS		
May 15	July 1	September 7
June 1	July 15	September 21
June 15	August 1	October 8
July 1	None	November 10
MASTERPIECE		
May 15	July 1	September 11
June 1	July 15	September 25
June 15	August 1	October 12
July 1	None	November 15
HELEN FRICK		
May 15	July 1	September 19
June 1	July 15	October 3
June 15	August 1	October 20
July 1	None	November 25



Well Grown Pot Plant

DATE OF LAST PINCH IS THE SAME AS SHADING DATE.

Insects and Their Control

APHIDS, OR PLANT LICE

All aphids are true sucking insects that insert their beaks through the surface of the leaf or stem and extract the juices from within.

INJURY. The feeding of aphids causes the plants to become sickly and stunted. The leaves curl inward, and when the flower terminal is infested the blooms will be deformed. Certain varieties of chrysanthemums are more susceptible to attack than others.

CONTROL. **Nicofume Fumigation** is an easy method of controlling the black aphid but will do very little to control the green or straw colored aphids. **Benzene Hexachloride** or **Parathion** are much more effective on the very resistant green or straw colored aphids. **Vapatone** is also effective when used at higher concentrations.

CHRYSANTHEMUM LEAF MINER

The larva or maggot disfigures and weakens chrysanthemum plants by mining in the leaves. It may do considerable harm to the crop, but is easily held in check.

INJURY. The young maggots burrow in the leaf tissue, leaving the upper and lower surfaces intact. The tunnels are irregular and winding. White blotches are thus formed, which later turn brown, and the leaves may die.

CONTROL. As soon as it is noticed that any leaves are infested, they should be picked off and burned. **Nicofume** spray will kill most of the maggots before they have time to do much damage. **Parathion** or **TEPP** aerosol bombs are very effective.

CHRYSANTHEMUM MIDGE

The chrysanthemum midge is one of the most serious pests with which the grower has to deal. Under optimum conditions a little over a month is required to complete the life cycle from the egg to the adult. The eggs are reddish-orange in color and are usually deposited on the tender tips of the growth. Under favorable conditions, the eggs hatch in about three days. The larva wanders about over the surface of the leaf for a day or two before finally penetrating into the leaf.

INJURY. The midge attacks all parts of the plant but prefers the tender growth. If the infestation takes place when the plants are small, they fail to grow, although if the plants are well developed when the infestation starts, the buds blight or are deformed and the plant is rendered unsalable.

CONTROL. Clean stock should be used wherever possible. Severely infested plants should be pulled up and burned. Nightly fumigation with **Calcium cyanide** or **Nicofume** pressure fumigators for 28 consecutive days will give good control. **Loro** 1-800 plus **DuPont Spreader Sticker**. 1-1200 sprayed every three days for 3 weeks then every week has proven to be one of the best controls. **Nicotine Dust** is also useful in keeping the plants covered and is especially useful when used in combination with fumigation. **Sodium selenate** is effective when applied in liquid form $\frac{1}{4}$ gram per square foot after plants are well established.



Aphids



Midge Injury to Leaves and Buds

Insects and Their Control

CORN EAR WORM

The corn ear worm is a green to brown, nearly smooth caterpillar, often mistaken for a cutworm when found within the buds or on the open flowers.

INJURY. It is very destructive to the opening buds, for it feeds on their petals and other parts, deforming if not entirely ruining the flowers.

CONTROL. If the attacked plants are blooming, spraying is out of the question, but thorough treatment with a 3 or 5% **D.D.T.** dust is recommended. After they have worked their way into the buds and are found to be feeding on the open flowers, hand-picking is the only remedy. Spraying the plants with **Deenate 50W** will control them before the color shows. **Parathion** fumigation will also keep them under control.

CUTWORMS

The larva is dull-colored and from one to more than two inches in length. They are most active at night, and usually spend the day coiled up just under the surface of the soil at the base of the plant. They should not be confused with the corn ear worm which cannot be controlled by poison baits.

INJURY. Cutworms obtain their food by biting out sections of the leaf, stem or bud. Various species attack different parts of the plant. The one that is most damaging climbs to the top of the stem and eats into the flower buds.

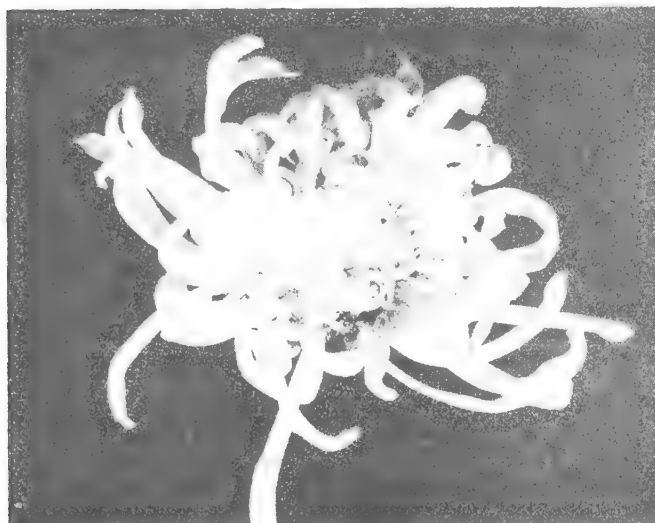
CONTROL. Those cutworms that feed on the foliage can best be controlled with **Deenate 50W** spray using 1½ pounds to 100 gallons of water. Cutworms are also controlled with a **poison bran bait** which should be distributed very thinly over the bench several consecutive nights. Poison bait formula consists of 5 pounds of wheat bran, enough water to moisten mash 4 ounces of Paris Green, 1 pint of molasses and one finely chopped lemon. **Parathion** has been suggested as a good control measure.

GREENHOUSE LEAF TYER

It gets its name from its habit of spinning light webs inclosing two or more leaves or tying together the parts of a single leaf. This caterpillar is very active, and when disturbed will wriggle off the leaf, often backwards, lowering itself on a silk-like strand.

INJURY. When first hatched, the larvae eat out shallow holes on the under side of the leaves. As they grow, they enlarge these holes but usually do not cut through to the upper surface. The result is that the leaves become skeletonized.

CONTROL. The best poison to control the larvae is **Deenate 50W**, either in the form of a dust or a spray. For liquid spray use 1½ pounds of **Deenate 50W** to 100 gallons of water. Add two pounds of tartar emetic, 4 pounds of sugar to 100 gallons of water. Spray the plants thoroughly so that the entire plant is covered. Pyrethrum sprays will kill the worms and not discolor the foliage. Regular fumigations with **Parathion** will keep the leaf tyer under control.



Corn Ear Worm Damage



Leaf Tyer

Insects and Their Control

MEALY BUGS

Mealy bugs are small, sluggish, whitish, soft bodied insects, measuring up to $\frac{1}{4}$ inch long, found in clusters on the undersides of the leaves or in the leaf axils.

INJURY. This pest sucks the juices from the stems and leaves, discoloring and deforming the foliage.

CONTROL. **Parathion** is the most effective. Regular fumigations with **Calcium Cyanide** will aid in keeping mealy bugs in check. The combination of **Greenhouse Volck 1-50** and **Nicofume liquid 1-400** when applied when temperatures are below 90 degrees will give good results. **Loro 1-800** and **DuPont Spreader Sticker 1-1200** if sprayed when temperatures are not too high is very effective.

MITES

Cyclamen mite and broad mite are often found on the same plants at the same time. Broad mite could pass through a complete generation in 4 to 5 days at 70 to 80 degrees while the Cyclamen mite will take 4 to 5 times longer.

INJURY. Infested leaves become deformed, curl from the outside inward, and wrinkle so that pockets and pit-like depressions are formed. When the infestation is severe, the mites collect about the buds, causing them to blight.

CONTROL. Fumigating with **Parathion** is very effective and easy to apply. **Vapotone** containing **HETP** has given good control. **Thiocide 1-200** and **DuPont Spreader Sticker 1-800** is an effective control measure. We recommend spraying every week or ten days during the growing season. **Sodium Selenate** is effective when applied in liquid form $\frac{1}{4}$ gram per square foot after plants are well established. **P40** used at the rate of 3 pounds per hundred square feet is another way to use sodium selenate.

RED SPIDERS

There are several species of red spiders that attack the chrysanthemum. They vary in color through yellow, orange and red. The body is oval in outline and bears eight well-developed legs.

INJURY. Red spiders pierce the epidermis of the leaf and draw the liquid contents from the cells, causing the leaf to turn pale around the injured portion. They prefer to collect on the under surfaces of the leaves, which they cover with silken threads.

CONTROL. **Parathion** or **TEPP** bombs are most effective and easiest to apply. **HEPT** or **TEPP** contained in insecticides such as **Vapotone** are by far the most effective on red spider. Spray thoroughly and heavily with **Yamtox** or some rotenone sprays as **NNOR**, **L333**, **OPTOX** at intervals of five days until the spider is cleaned up. Moisture is detrimental to the development of the red spiders and frequent syringing washes them and their eggs off the plants. **Loro 1-800** plus **DuPont Spreader Sticker 1-1200** has given good control but should be applied with caution as it will injure foliage when temperatures are high. **Sodium selenate** is effective when applied in liquid form $\frac{1}{4}$ gram per square foot or **P40** at 3 pounds per 100 sq. ft. after plants are well established.

SYMPHYLIDS

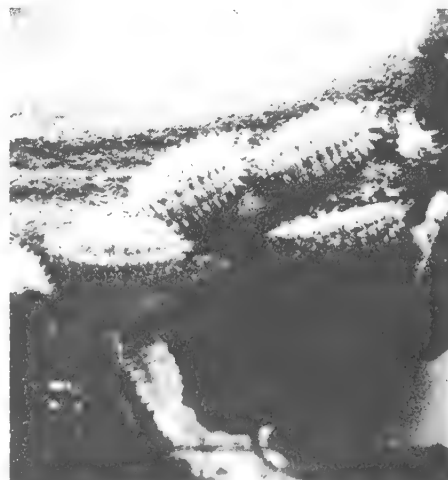
Symphylids are small white creatures about $\frac{1}{8}$ to $\frac{3}{16}$ inches long. About 40-60 days are necessary for the completion of the life cycle.

INJURY. Symphylids destroy the fine root hairs and small rootlets, thus stunting the plants and often killing them outright.

CONTROL. If possible construct raised bench. Steam sterilization has given fair control. **Dowfume G** and the new **Greenhouse Isotox Dust** are giving excellent control of this pest.



Red Spider Injury



Mealy Bugs



Symphylids Enlarged 10x

Insects and Their Control

SOWBUGS

INJURY. Sowbugs often become so plentiful in the greenhouse that they eat the newly planted cuttings at the base.

CONTROL. Any of the many poison baits will give partial control but a complete spraying with DDT under the benches has given excellent control. **Deenate 50W** will give complete control.

TARNISHED PLANT BUGS

The tarnished plant bug or sting fly comes into the greenhouse through open doors and ventilators in late summer or early fall and does considerable harm to this crop. Chrysanthemums growing in the open are frequently affected. Varieties such as Mary L. Hall and Sea Gull are attacked to a greater extent than other varieties.

INJURY. It has sucking mouth parts and obtains its food by inserting its long, slender beak into the plant tissues and sucking up the contents of the injured cells, apparently injecting saliva, which causes the death of the tissue in the immediate vicinity. The stem is often slightly bent and the terminal growth is malformed because of this injection.

CONTROL. Early morning spraying or dusting with any of the pyrethrum materials will kill those bugs that are present but this will have to be done each day for complete eradication. **Deenate 50W** has been giving fair control but again this insecticide is best used as a contact. **Parathion** fumigation will control this insect in the greenhouse.

THRIPS

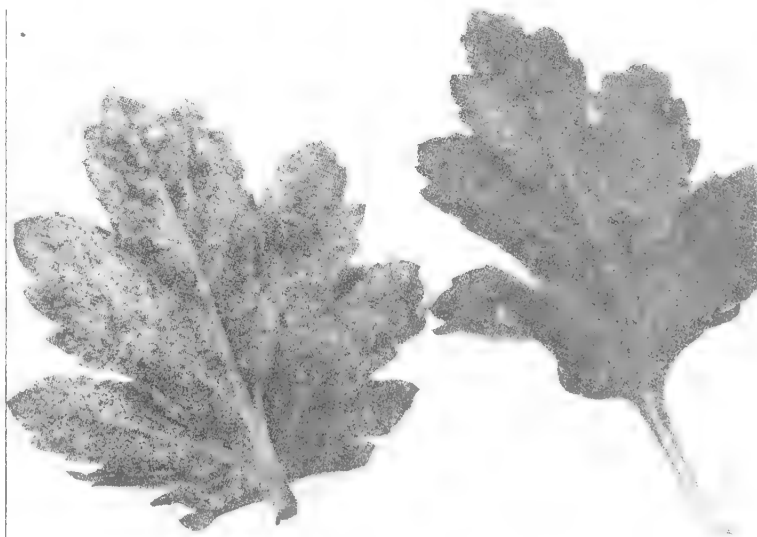
The chrysanthemum is usually attacked by one or more species of thrips. These small, narrow-bodied, active insects which range in color from yellow to brown or almost black, injure both the leaves and the blossoms.

INJURY. Thrips have mouth parts that are fitted for piercing and scraping the leaf surface and for sucking the juices and other cell contents. The upper surface of the foliage is covered with whitish blotches while minute black specks appear on the lower surface. Unless a constant watch is kept on the plants, and control measures properly executed, thrips are capable of causing severe injury within a short time.

CONTROL. **Deenate 50W** used at the rate of 1-1½ pounds to 100 gallons of water is a very effective control. Other insecticides containing **Benzene Hexachloride** are also recommended. **Parathion** will control the chrysanthemum and onion thrips.



Tarnished Plant Bug



Thrip Injury

Pests and Their Control

FOLIAR NEMATODE

The spread of this pest has been very rapid in recent years owing to the increased trade in chrysanthemums, and the ease with which the nematode is transported in plants and cuttings. Too few growers have become familiar with this pest and consequently no effort has been put forth to control it.

SYMPTOMS. The leaves attacked become blotched, turn at first greenish-yellow, then brownish, later gray and finally black until the entire leaf dies and hangs down on the stem. Under conditions of high humidity, both in the open during a wet season and under glass owing to excessive watering, the spread of the pest may be extremely rapid.

CONTROL. Sodium Selenate applied in liquid form to the soil at the rate of $\frac{1}{4}$ gram per square foot of bed area is the most satisfactory control. Dissolve 1 pound of sodium selenate into $4\frac{1}{2}$ gallons of water, then take one quart of this stock solution and add to 25 gallons of water and this should be applied on 100 square feet of bench surface. One pound of sodium selenate will treat 1800 square feet. The safest method is to make 2 applications at the $\frac{1}{8}$ gram rate a week or so apart. P40 applied at the rate of 3 pounds per 100 square feet has given fair control. Wait 2 to 4 weeks after benching before applying. This chemical may burn some varieties. It is better to apply P40 in 2 applications, 7 to 10 days apart.

MILDEW

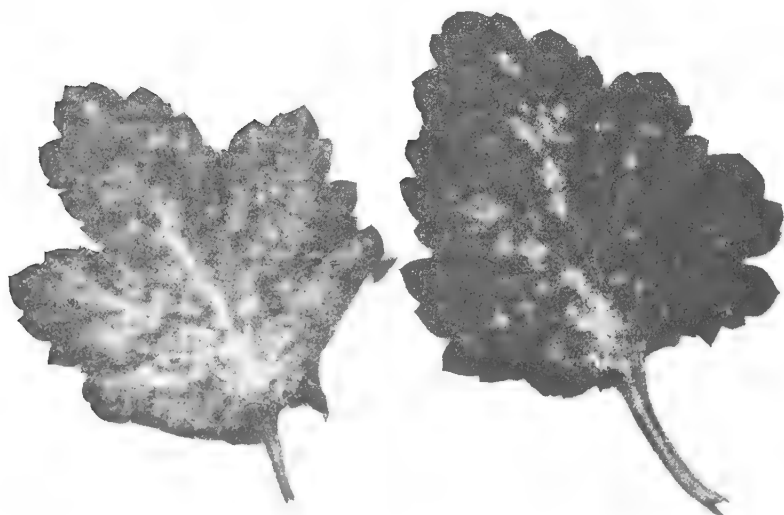
SYMPTOMS. Whitish powdery growth on upper surface of leaves.

CONTROL. Spray at regular weekly intervals with a good **Wettable Sulfur**, 1 lb. per 100 gallons of water to which a good commercial spreader has been added. **Fermate**, 1 ounce to 4 gallons of water is effective.

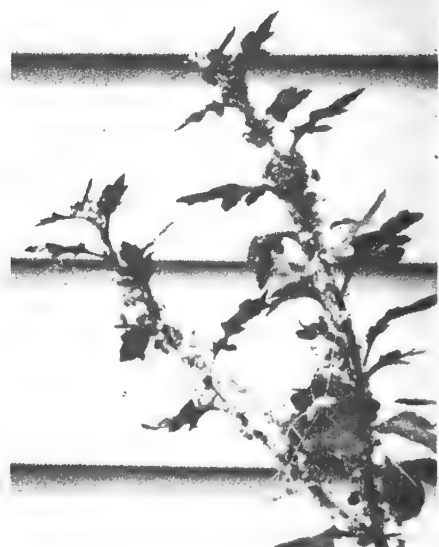
ROOT KNOT NEMATODE

SYMPTOMS. The nematodes or eelworms bore into the roots of the plants and cause knots or galls to develop on the root systems. As a result the plants are weak, yellowish and stunted in growth.

CONTROL. Steam sterilization of the soil is very effective in eliminating the nematodes. **Dowfume G** is a good soil fumigation that will kill nematodes and not do any damage to the surrounding plants.



Mildew



Dodder Growing on Mums

Diseases and Their Control

ROOT ROT

SYMPTOMS. Entire plant will wilt and recover during the evening. Foliage turns yellow, plant will die in a very short time. A number of soil borne organisms cause the loss of the roots.

CONTROL. Do not plant cuttings that have been infected with damping off. Use sterilized soil. Remove all affected plants when noticed. Do not keep the soil too moist.

RUST

SYMPTOMS. Chocolate brown powdery pustules on the lower surface of the leaves

CONTROL. *Fermate*, 1 ounce to 4 gallons of water is most effective.

SEPTORIA LEAF SPOT OR LEAF BLIGHT

SYMPTOMS. Distinct circular spots on the leaves. These are greyish brown in color and become brittle in the center. Affected leaves may turn yellow and die. More prevalent in the open. Some varieties are more susceptible than others. *Sea Gull* is very susceptible.

CONTROL. When cuttings are received dunk the tops into *Fermate* (2 tablespoonfuls to a gallon). Spray the plants in *Fermate* 1 ounce to 4 gallons of water plus $\frac{1}{3}$ teaspoonful of *DuPont Spreader Sticker* every ten to fourteen days. Cloth house mums should be kept covered until the buds can be seen. May we recommend that you add the sticker and a little water into a jar then add the *Fermate* and shake thoroughly. Then dump *Fermate* from the jar into sprayer with proper amount of water.

VERTICILLIUM WILT OR SEIDEWITZ DISEASE

SYMPTOMS. Margins of leaves turn yellow and eventually wilt or dry up. This begins at base of plant and works up the stems. May affect one side of a stem or plant more than the other. No distinct spots. Varieties vary in resistance to this disease.

CONTROL. Verticillium wilt can be avoided by purchasing our disease free cuttings produced from cultured stock. It is also necessary to plant only into sterilized soil.

DODDER

SYMPTOMS. Dodder is a parasitic twiner, bearing clusters of small flowers. They are leafless annuals, with very slender yellow, white or red stems, which become attached to the plant by means of root-like suckers. Dodder is occasionally found on chrysanthemums and will cause a complete loss of crop.

CONTROL. Dodder is common in low, weedy places and may be carried into the greenhouse in the soil or manure. Soil sterilization is the only prevention. After dodder is attached to the plants remove the affected plants and burn.



Rust on Chrysanthemum

Septoria Leaf Spot

Pests and Their Control

COMBINATION SPRAYS

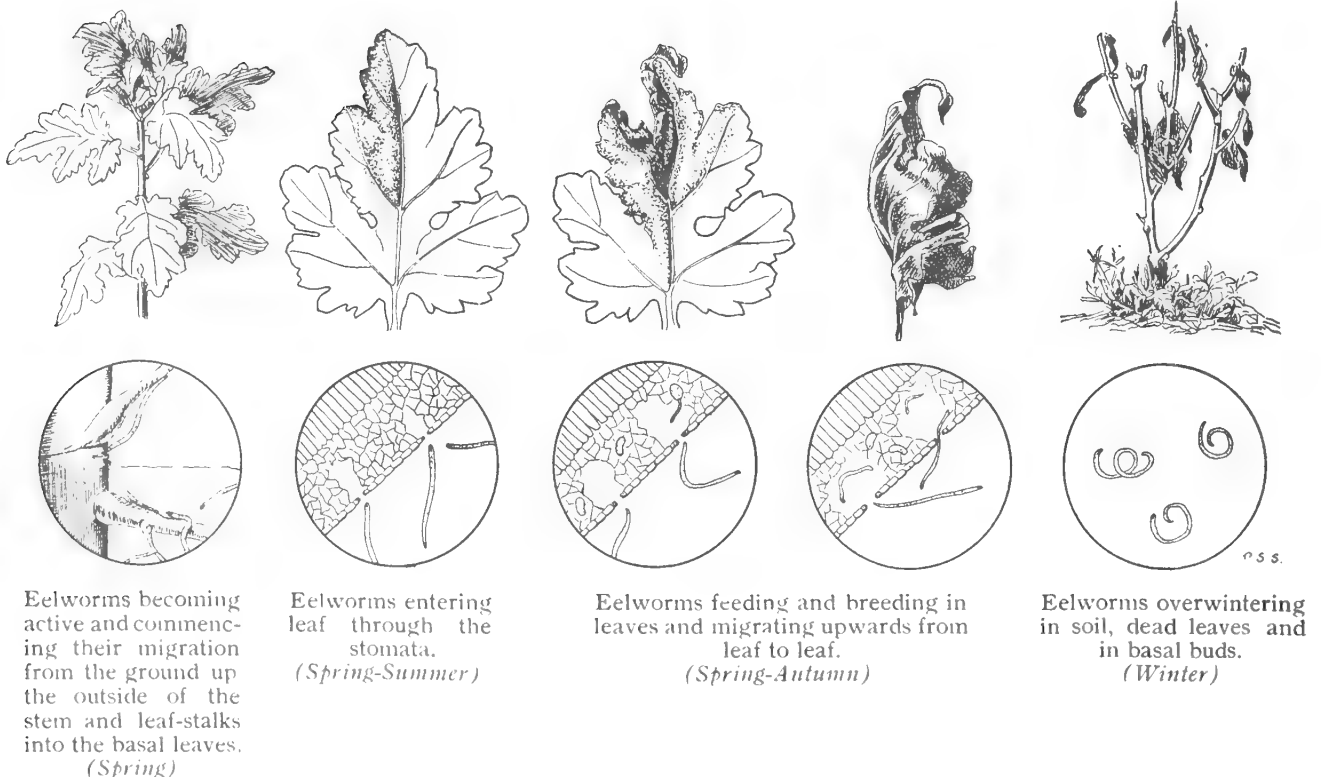
At times it is more economical and convenient to mix two or more sprays and apply them in one operation. Before such mixtures are prepared, the grower should be sure no reaction harmful to the plants will occur, and that the efficiency of the separate ingredients is not reduced. Consult your State Entomologist or Plant Pathologist for information on combination sprays for specific crops.

A good combination spray for chrysanthemums which will control most diseases and insect pests, can be made with Fermate, DDT and Vaportone. Details on dilutions are as follows:

Material	Amount to make		
	100 gallons	20 gallons	3 gallons
Water	100 gallons	20 gallons	3 gallons
DuPont Spreader Sticker	6 oz.	2 tablesp.	1 teasp.
Fermate	1 lb.	1/4 lb.	3 tablesp.
Deenate 50W	1 lb.	1/4 lb.	1 1/2 tablesp.
Vaportone	1/2 pt.	3 1/2 tablesp.	1 1/2 teasp.

To prepare: (1) Measure out spreader and dilute in small amount of water. (2) Fill tank with required water and add the diluted spreader and stir. (3) Take out a small amount in jar, add the proper amount of the Fermate and shake vigorously until all the powder is thoroughly wetted. (4) Pour this mixture back into the tank, preferably through a fine screen or cheesecloth and stir. (5) Measure out Vaportone and dilute in small amount of water and add to the tank. Keep stirring or keep agitator running while adding the materials.

BIOLOGY OF THE FOLIAR NEMATODE



Newer Insecticides

Parathion

Parathion, as an insecticide, was discovered by chemists and entomologists of the I. G. Farben Corp. in Germany during the war, as a result of preparing and testing over 300 phosphorus compounds, following earlier work on phosphorus-fluorine compounds for war gases.

This new insecticide shows promise of being the most important material yet discovered for greenhouse pest control. **Parathion** remains effective for a week or more both as a contact and stomach poison. This continued killing effect is very important in giving better control of many pests with fewer applications.

Parathion aerosol is very effective against many of the pests attacking chrysanthemums and it is safe on all varieties listed in this manual. If moisture is present on the foliage or bloom, a burn certain. **Parathion** aerosol will give control of red spiders, mites, black aphids, green aphids and the straw colored aphids (thought to carry the virus Stunt), thrips, greenhouse leaf tyers, mealy bugs and the leaf miners.

The **Parathion** aerosol is applied in the same manner as the HETP aerosol, through an applicator consisting of a flexible hose, brass rod and oil burner nozzle, directing the aerosol mist into the air above the plants. A gas mask and protective clothing should be used when applying this insecticide.

Greatest effectiveness is obtained with temperatures of 75°F or above at the time of application and with vents kept closed for four hours, although excellent kills have been secured at temperatures as low as 65° and with vents closed for only two hours. Dr. Blauvelt, Cornell University, reports that parathion aerosol was applied with safety to many commercial greenhouse crops.

Hexaethyl Tetraphosphate

This new insecticide is available under trade names of **Vapotone**, **Hexcide**, **Blot**, **Kill-Ex** and **Arbortox 64** and very likely many more will be added within the year. **HETP** as it is commonly referred to in the trade is used as a spray or in aerosol dispensers. This new insecticide is extremely effective in killing the active stages of red spider, but little kill on the eggs. This material also gave good control for thrips, leaf tyers, aphids and mealy bugs. Follow the directions of the manufacturer and remember this material kills on contact only so you will have to do a thorough spraying to get good results.

HETP will decompose very rapidly after it is mixed with water, therefore is necessary to use the mixed spray very soon after mixing and never hold over any left over spray mixture. **Precaution** is to spray **HEPT** in the morning so the plants will dry off rapidly. In cloudy weather or when the humidity is exceptionally high the foliage will stay moist for three to four hours after spraying and a spotting of the leaves will appear on chrysanthemums.

Aerosol bombs are being carefully tried by the U.S.D.A. and excellent control of red spider may be expected by making four applications at three-day intervals. Allow the houses to stay closed for about 1½ hours after the application. The range of temperature is from 60-90 degrees.

Sodium Selenate

This material has been on the market for the past several years but is comparably new to a large number of growers. This material is applied to the soil and is absorbed by the plant through the roots. It will kill foliar nematodes, red spider, mites, midge and aphids. Available as **P-40** or as a powder, applications every 3 months are necessary as it leaches from the soil.

P-40 is applied dry at the rate of 3 pounds per 100 square feet of area. Sodium selenate crystals are applied in liquid form and a stock solution is made by dissolving 1 pound in 4½ gallons of water.

For most crops the suggested dosage is ¼ gram sodium selenate per square foot (equal to 1 pound to 1800 square feet.) Each quart of stock solution contains 25 grams and is therefore enough for 100 square feet of bench surface. It must be diluted with additional water to get even application and good distribution in the soil. Full directions are available with the material.

On chrysanthemums we recommend ¼ gram sodium selenate per square foot. The safest method is to make two applications at the ⅛ gram rate a week or so apart.

Follow the precautions and syringe off any solution which might get on the foliage. Do not treat plants until 2 or more weeks after transplanting. Be sure to apply the correct amount evenly. Sodium selenate is a poison and treat it as such.

Chrysanthemum Stunt

For the past three or four years a new trouble of chrysanthemums known as stunt has been observed. At first, this irregularity was confined to a few varieties but in the 1947 and 1948 season almost all varieties were observed to carry a percentage of stunt. This trouble has been observed in all areas producing chrysanthemums.

SYMPTOMS OF STUNT

Prof. A. W. Dimock, Cornell University, describes stunt as follows: "As with all other diseases, symptoms of stunt vary with the variety, but the following have been more or less consistent: (a) the young foliage may be paler than normal and has a tendency to more upright growth rather than growing at a wide angle with the stem; (b) diseased plants show stunting in growth after they have been in the soil a few weeks, and at maturity they may in some cases be less than half as tall as normal; (c) buds may form and blossoms open a week or 10 days ahead of those on healthy plants, although on some varieties stunted plants will bloom after the normal plants; (d) with varieties possessing red pigment (the bronzes, pinks and reds) the red component of the color is badly bleached; (e) with some varieties the blossoms may be greatly reduced in size."

CAUSE OF THE TROUBLE

Almost all of the research institutions are spending considerable time trying to find the cause of stunt. Dr. Philip Brierley and Dr. Floyd F. Smith, U.S.D.A., Beltsville, Md., have fairly good evidence that it is a virus. They have shown definitely that it is transmitted with cuttings taken from diseased stock. In addition, spread has occurred from diseased varieties to others not previously affected, indicating that it has been transmitted by an insect or through manual means. Just what insect or manual handling involved is not yet known. Stunted plants have never been known to reproduce anything but stunted plants.

Many ideas as to the cause of stunt have been proposed such as, over propagated stock, lighted stock, hormone treatment, not allowing the stock to flower and many others. After observing the spread of stunt in various establishments where the treatment of stock was the same used for years, it is impossible to lay the cause to anything but a virus.

If the healthy plants are selected after flowering from a lot where stunted plants were present it is known that the next generation will likewise be badly stunted. This indicates that the virus is already in those normal blooming plants.

CONTROL MEASURES

Not knowing how stunt is spread from plant to plant and how long the incubation period is, makes it difficult to set-up a definite control measure. But by assuming that an insect or that manual operations carries this trouble the following suggestions have been recommended by research investigators. (1) Select only the healthiest plants in June or early July for stock purposes. (2) Use a sterile knife when removing cuttings or pinching the plants. (3) Keep all insects from these plants by isolation and use of good insecticides. (4) Rogue out all plants from time to time that look the least bit weaker. (5) Be careful not to bruise or handle the plants. (6) Use single plant selection procedure and keep case history on each clon.

Realizing that such a procedure to keep stock clean from stunt is very expensive and that all growers cannot carry out these control measures it is therefore, necessary for the propagators of chrysanthemum cuttings to carry out this extreme control measure.

Yoder's Re-selection Program

Yoder Bros. Inc., started a re-selection program in the early summer of 1947. During June and July only the most vigorous plants were selected and the cuttings were removed by holding the cutting with sterile tissue and snapping the tip off without the use of a knife. Each cutting was so handled and then placed in an isolated propagation bench spaced 5 inches by 5 inches. After rooting, these selected cuttings were planted one to a 7 inch pot and each labeled and numbered. As this was done with each variety listed one can readily figure out the amount of equipment and space this program consumed. All containers and growing media were steam sterilized. These plants were grown under conditions where insects were constantly under control. Careful handling of plants so as not to injure the cells was constantly in vogue.

From time to time a trained worker checked each plant and if any abnormal growth was noted the plant was removed from the isolation house and destroyed.

FLOWERING THE RE-SELECTED STOCK

In the spring of 1948 a uniform number of cuttings was taken from each pot and planted in a block and allowed to flower. Each lot was labeled to correspond with the number of the mother stock plant.

During the growing season of 1948 these re-selected flowering trials were checked weekly and volumes of data were collected. The flowering trials were grown under standard growing practices. As fast as any evidence of stunt showed up on these nuclear flowering trials the mother stock plant was destroyed and if any other cuttings were propagated from that plant they too were destroyed.

It is remarkable to notice that varieties such as Blazing Gold, Betsy Ross, Good News, Friendly Rival and others that were badly stunted in 1947 season were practically free from stunt in the 1948 re-selected flowering trials.

1949 COMMERCIAL CUTTINGS

The stock plants that are to be used for 1949 cuttings will come from single plant selections that showed no stunt in the flowering trials of 1948. In other words the cuttings will come from selected re-selected stock. The same safeguards that were used in growing the re-selected stock plants in 1948 will be followed with this crop of selected re-selected plants.

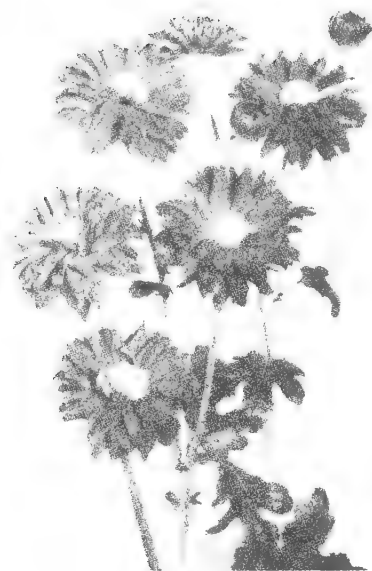


Use of Parathion with Proper Dress for Applying



Chrysanthemum Stunt in Indianapolis White

Novelty Chrysanthemums



MINSTREL

A large lavender pompon of excellent, substance. The form is beautiful and its heavy petallage permits a long period of cutting. Easily the best pompon in this color class for December and Christmas. Minstrel is more exacting in its cultural requirements. Will go blind if grown too cool when buds are initiating.



CHRISTMAS STAR

This variety was originally shown as Carnival at the Chrysanthemum Society of America show. A scarlet red single flowering for Christmas. Christmas Star will be a welcome addition for the holiday trade. It retains its brilliance with full maturity. It bunches well and because of its striking color compels attention when displayed with other varieties.



YULEFLAME

A large decorative yellow pompon similar to Vibrant which blooms with the variety Revelation. Yuleflame will produce very well under a wide range of cultural environments. Will not go blind. We predict that this variety will be widely grown. Will respond to culture very similar to Vibrant.

All Above Price per 100

500
\$7.00

100 to 450
\$7.50

50
\$8.00

Novelty Chrysanthemums

GOLDEN ANNIVERSARY

A golden yellow pompon about the size of Sunny-side that flowers for Christmas and later. The flowers are produced on well spaced sprays. A desirable yellow small pompon flowering at a period when small varieties are not plentiful. This hard, round flower will find a ready market at this late season of bloom.



BRONZE MINUET

An apricot bronze sport of Minuet. It is a reliable producer and responds well under a wide diversity of cultures. It blooms at a period when a lively bronze of top quality is in great demand. Bronze Minuet shows up well under artificial light. An outstanding addition for late November bloom.

MARY McARTHUR

A pinkish bronze, early high quality, small pompon. The flower resembles Mrs. Morgan Bulkeley in size, form and substance. It responds very well to black cloth shading and is very useful in the earliest shading, also grown as a garden variety in some sections.



All Above Prices per 100

500 up
\$7.00

100 to 450
\$7.50

50
\$8.00

Large Flowering Varieties

YELLOW

Name	Last Pinch	Height	Select Bud	Matures	Price per 100		
					500 up	100 to 450	50
Gold Lode	July 5	Med.	Aug. 25	Oct. 15	\$4.00	\$4.50	\$5.00
Mrs. H. E. Kidder	July 12	Med.	Aug. 25	Oct. 20	4.00	4.50	5.00
Blazing Gold	July 12	Short	Aug. 25	Oct. 25	4.50	5.00	5.50
Sunglow	July 12	Med.	Aug. 25	Oct. 25	4.00	4.50	5.00
Good News	July 16	Med.	Aug. 30	Nov. 5	4.50	5.00	5.50
Indianapolis Yellow	July 19	Med.	Sept. 5	Nov. 8	4.50	5.00	5.50
Yellow Queen	July 20	Med.	Sept. 8	Nov. 10	6.00	6.50	7.00
Yellow Monument	July 22	Med.	Sept. 10	Nov. 15	4.00	4.50	5.00
Bonnaffon DeLuxe	July 25	Short	Sept. 20	Nov. 20	4.00	4.50	5.00
Friendly Rival	July 25	Med.	Sept. 20	Nov. 20	4.00	4.50	5.00
Yellow Mefo	July 25	Med.	Sept. 20	Nov. 20	4.50	5.00	5.50
Harvester	July 28	Med.	Sept. 25	Nov. 23	6.00	6.50	7.00
Marie DePetris	July 28	Short	Sept. 25	Nov. 23	4.00	4.50	5.00
Imp. Yellow Chattanooga	July 28	Tall	Sept. 25	Nov. 25	4.00	4.50	5.00
Golden Pearson	July 28	Tall	Sept. 30	Nov. 25	4.00	4.50	5.00
Golden Mrs. Ross	July 31	Tall	Sept. 30	Dec. 3	4.00	4.50	5.00
Golden Mistletoe	Aug. 4	Med.	Sept. 30	Dec. 10	4.00	4.50	5.00
Imp. Tobin's Yellow	Aug. 10	Short	Sept. 30	Dec. 15	5.00	5.50	6.00
Meteore	Aug. 10	Med.	Oct. 1	Dec. 15	6.00	6.50	7.00

WHITE

Silver Sheen	July 12	Med.	Aug. 30	Oct. 20	4.00	4.50	5.00
Albatross	July 16	Med.	Aug. 30	Nov. 1	4.50	5.00	5.50
Betsy Ross	July 16	Med.	Aug. 30	Nov. 1	4.00	4.50	5.00
Indianapolis White	July 19	Med.	Sept. 5	Nov. 8	4.50	5.00	5.50
Jean Elizabeth	July 20	Med.	Sept. 8	Nov. 10	5.00	5.50	6.00
Monument	July 22	Med.	Sept. 10	Nov. 15	4.00	4.50	5.00
Marketeer	July 25	Short	Sept. 15	Nov. 18	4.00	4.50	5.00
Mefo	July 25	Med.	Sept. 20	Nov. 20	4.50	5.00	5.50
Chattanooga	July 28	Tall	Sept. 30	Nov. 25	4.00	4.50	5.00
Dec. Glory Large	July 31	Med.	Sept. 30	Dec. 1	4.00	4.50	5.00
Margaret Moeller	July 31	Med.	Sept. 30	Dec. 5	4.00	4.50	5.00
White Mistletoe	Aug. 4	Med.	Sept. 30	Dec. 10	4.00	4.50	5.00
Smith's Late White	Aug. 10	Short	Sept. 30	Dec. 15	5.00	5.50	6.00

Minimum Order 50 Cuttings of a Variety

Large Flowering Varieties

BRONZE and RED

Name	Last Pinch	Height	Select Bud	Matures	Price per 100		
					500 up	100 to 450	50
Detroit News	July 16	Med.	Aug. 30	Nov 5	\$4.50	\$5.00	\$5.50
Indianapolis Bronze	July 19	Med.	Sept. 5	Nov. 8	4.50	5.00	5.50
Anaconda	July 19	Tall	Sept. 10	Nov. 10	4.50	5.00	5.50
Mrs. David Roy	July 22	Short	Sept. 15	Nov. 15	5.00	5.50	6.00
Gladys Pearson	July 28	Tall	Sept. 30	Nov. 25	4.00	4.50	5.00
Oak Leaf	July 28	Tall	Sept. 30	Nov. 25	4.00	4.50	5.00
Bronze Mistletoe	Aug. 4	Med.	Sept. 30	Dec. 10	4.00	4.50	5.00

PINK

Pink Chief	July 5	Tall	Aug. 25	Oct. 15	4.50	5.00	5.50
J. W. Prince	July 16	Short	Aug. 30	Nov. 5	4.50	5.00	5.50
Indianapolis Pink	July 19	Med.	Sept. 5	Nov. 8	4.50	5.00	5.50
Dark Pink Orchid Queen	July 20	Med.	Sept. 8	Nov. 10	6.00	6.50	7.00
Orchid Queen	July 20	Med.	Sept. 8	Nov. 10	5.00	5.50	6.00
Helen Frick	July 28	Short	Sept. 25	Nov. 23	4.50	5.00	5.50
Ed. Seidewitz	July 30	Tall	Sept. 25	Nov. 25	4.00	4.50	5.00
Pink Mistletoe	Aug. 4	Med.	Sept. 30	Dec. 10	4.00	4.50	5.00

Odd Formed—Spider Varieties

Kay Tashima — white	July 12	Med.	Aug. 25	Oct. 25	6.00	6.50	7.00
Red Spider — magenta	July 16	Med.	Sept. 5	Nov. 5	6.00	6.50	7.00
Yellow Rayonante — yellow	July 16	Med.	Sept. 5	Nov. 5	6.00	6.50	7.00
Peggy Ann Hoover — pink	July 16	Med.	Sept. 5	Nov. 5	6.00	6.50	7.00

Minimum Order 50 Cuttings of a Variety

Pompon and Decorative Varieties

YELLOW

Name	Last Pinch	Height	Size & Type	Matures	Price per 100		
					500 up	100 to 450	50
Rodell Improved	July 5	Short	Int. Pom.	Oct. 20	\$4.00	\$4.50	\$5.00
Gold Coast	July 12	Med.	Int. Pom.	Oct. 25	5.00	5.50	6.00
Golden Herald	July 12	Med.	L. Dec.	Oct. 25	4.50	5.00	5.50
Yellow Dot	July 12	Med.	Int. Pom.	Oct. 25	4.00	4.50	5.00
Yellow Arcadia	July 16	Med.	Int. Pom.	Oct. 28	4.00	4.50	5.00
Mary L. Hall	July 16	Tall	Int. Pom.	Nov. 1	4.00	4.50	5.00
Barcarole	July 19	Med.	Int. Pom.	Nov. 5	4.00	4.50	5.00
Constellation	July 19	Med.	Int. Dec.	Nov. 5	6.00	6.50	7.00
Nuggets	July 19	Short	S. Pom.	Nov. 5	4.00	4.50	5.00
Princeton	July 22	Med.	Int. Dec.	Nov. 15	4.50	5.00	5.50
Yellow Fellow	July 22	Med.	Int. Dec.	Nov. 15	4.50	5.00	5.50
Goldsmith	July 28	Med.	Int. Dec.	Nov. 25	4.50	5.00	5.50
Sunnyside	July 28	Med.	Int. Pom.	Nov. 25	4.00	4.50	5.00
Yellow Cordova	July 28	Med.	Int. Dec.	Nov. 30	4.00	4.50	5.00
Omega	July 31	Med.	Int. Pom.	Dec. 5	6.00	6.50	7.00
Yellow Cameo	July 31	Med.	Int. Dec.	Dec. 5	5.00	5.50	6.00
December Gold	Aug. 2	Med.	Int. Dec.	Dec. 15	5.00	5.50	6.00
Vibrant	Aug. 4	Med.	Int. Dec.	Dec. 20	4.50	5.00	5.50
Golden Anniversary	Aug. 10	Med.	Int. Pom.	Dec. 25	7.00	7.50	8.00
Yellow Snow	Aug. 10	Med.	Int. Pom.	Dec. 25	4.00	4.50	5.00
Yuleflame	Aug. 10	Med.	Int. Dec.	Dec. 30	7.00	7.50	8.00

WHITE

Irene-	July 8	Short	S. Pom.	Oct. 18	4.00	4.50	5.00
Minong	July 12	Short	S. Pom.	Oct. 20	4.00	4.50	5.00
Cotton Top	July 12	Med.	Int. Pom.	Oct. 25	5.00	5.50	6.00
Pinocchio	July 12	Med.	S. Pom.	Oct. 25	5.00	5.50	6.00
Arcadia	July 16	Med.	Int. Pom.	Oct. 28	4.00	4.50	5.00
Sea Gull	July 16	Tall	Int. Pom.	Nov. 1	4.00	4.50	5.00
White Doty	July 16	Tall	L. Pom.	Nov. 1	4.00	4.50	5.00
Rev. Bushnell	July 19	Tall	Int. Pom.	Nov. 8	4.50	5.00	5.50
Vesper	July 19	Tall	Int. Pom.	Nov. 10	4.00	4.50	5.00
Matchless	July 25	Tall	Int. Pom.	Nov. 20	5.00	5.50	6.00
Seafoam	July 25	Med.	Int. Pom.	Nov. 20	4.00	4.50	5.00
Priscilla	July 28	Tall	L. Pom.	Nov. 23	5.00	5.50	6.00
Cordova	July 28	Med.	Int. Dec.	Nov. 30	4.00	4.50	5.00
Cameo	July 31	Med.	Int. Dec.	Dec. 5	4.50	5.00	5.50
Snow	Aug. 10	Med.	Int. Pom.	Dec. 25	4.00	4.50	5.00
Revelation	Aug. 10	Med.	Int. Pom.	Jan. 5	4.00	4.50	5.00

Minimum Order 50 Cuttings of a Variety

Pompon and Decorative Varieties

PINK

Name	Last Pinch	Height	Size & Type	Matures	500 up	Price per 100 100 to 450	50
Jewell	July 8	Short	S. Pom.	Oct. 15	\$4.00	\$4.50	\$5.00
Caroline Yosick	July 8	Med.	S. Dec.	Oct. 20	6.00	6.50	7.00
Mary McArthur	July 12	Med.	Int. Pom.	Oct. 25	7.00	7.50	8.00
Jessie	July 12	Med.	Int. Pom.	Oct. 25	4.00	4.50	5.00
Pink Dot	July 12	Med.	Int. Pom.	Oct. 25	4.00	4.50	5.00
Dark Pink Bulkeley	July 19	Tall	Int. Pom.	Nov. 8	4.50	5.00	5.50
Thyra	July 19	Med.	L. Pom.	Nov. 10	4.00	4.50	5.00
Masterpiece	July 22	Med.	L. Pom.	Nov. 15	4.00	4.50	5.00
Minuet	July 28	Med.	Int. Pom.	Nov. 25	5.00	5.50	6.00
Riviera	Aug. 2	Med.	Int. Dec.	Dec. 10	4.00	4.50	5.00
Pink Treasure Island	Aug. 6	Med.	Int. Dec.	Dec. 20	4.00	4.50	5.00
Minstrel	Aug. 10	Med.	L. Pom.	Dec. 20	7.00	7.50	8.00

BRONZE

Fire Bird	July 12	Med.	Int. Dec.	Oct. 25	4.50	5.00	5.50
Seneca	July 16	Med.	Int. Dec.	Nov. 1	6.00	6.50	7.00
Cassandra	July 19	Med.	Int. Pom.	Nov. 5	4.50	5.00	5.50
Red Rust	July 19	Med.	Int. Dec.	Nov. 5	6.00	6.50	7.00
Bronze Masterpiece	July 22	Med.	L. Pom.	Nov. 15	4.00	4.50	5.00
Legal Tender	July 25	Med.	Int. Dec.	Nov. 20	4.00	4.50	5.00
Rusticon	July 25	Med.	Int. Dec.	Nov. 20	5.00	5.50	6.00
Bronze Goldsmith	July 28	Med.	L. Dec.	Nov. 25	4.50	5.00	5.50
Bronze Minuet	July 28	Med.	Int. Pom.	Nov. 25	7.00	7.50	8.00

RED

Navaho	July 19	Med.	Int. Dec.	Nov. 10	5.00	5.50	6.00
Red Princeton	July 22	Med.	Int. Dec.	Nov. 15	4.50	5.00	5.50
Debonair	Aug. 2	Tall	L. Pom.	Dec. 10	5.00	5.50	6.00

Minimum Order 50 Cuttings of a Variety

Insecticides and Fungicides

Benzene Hexachloride Spray		
	Pt. \$5.00 — Qt. \$8.00 — Gal. \$25.00	
Calcium Cyanide G. Fumigant		
	5 lbs. \$3.75 — 25 lbs. 12.50	
Deenate 50 W. (DDT)	4 lbs. \$2.25 — 25 lbs. 11.25	
DuPont Spreader Sticker	Gal. \$6.25 — 5 Gal. 30.00	
Evergreen		Gal. 12.60
Fermate	3 lbs. \$2.70 — 25 lbs. 18.75	
Isotox 15 Dust		20 lbs. 8.00
Loro	Gal. \$10.50 — 5 Gal. 45.00	
Nicofume Liquid		Gal. 11.95
Nicofume Pressure Fumigators		
	1/2 lb. cans (12 cans)	4.80
	1 lb. cans (12 cans)	8.35
NNOR		Gal. 10.00

Optox		Gal. \$12.00
Parathion Bombs	4 lb. Bombs—ea.	10.00
	(2 Bombs Minimum Order)	
Parathion Dust 2%	25 lbs. \$10.00 — 50 lbs.	18.00
Parathion Spray—15% Wettable	4 lb. bag	7.00
P40	25 lbs. \$4.75 — 50 lbs.	9.00
	100 lbs. \$17.00 — 1000 lbs.	160.00
Sodium Selenate		per lb. 4.00
TEPP Bombs	4 lb. Bombs—each	6.25
Tobacco Dust	100 lbs. \$3.50 — Ton	65.00
Thiocide		Gal. 6.00
Vapotone		Gal. 11.90
Yamtox with DDT		Gal. 12.00
Yamtox with B.H.C.		Gal. 18.00

*Single-Daisy Type Varieties***YELLOW**

Name	Last Pinch	Height	Size & Type	Matures	Price per 100		
					500 up	100 to 450	50
Yellow Daisy	July 16	Med.	Int.	Nov. 1	\$4.50	\$5.00	\$5.50
Golden Jane	July 28	Tall	Large	Nov. 30	4.50	5.00	5.50

WHITE

White Mensa	July 22	Med.	Int.	Nov. 10	4.00	4.50	5.00
Yukon	Aug. 7	Tall	Int.	Dec. 10	4.00	4.50	5.00

BRONZE

Bronze Buckingham	July 16	Short	Int.	Nov. 3	4.00	4.50	5.00
Sylvanna	July 22	Med.	Int.	Nov. 10	4.00	4.50	5.00
Apricot Valencia	July 28	Tall	Large	Nov. 30	4.50	5.00	5.50

PINK

October Pink	July 16	Med.	Int.	Oct. 28	5.00	5.50	6.00
W. H. Buckingham	July 16	Short	Int.	Nov. 3	4.50	5.00	5.50
Brocade	July 22	Med.	Int.	Nov. 15	6.00	6.50	7.00
Hasegawa Pink	July 28	Med.	Int.	Nov. 25	4.00	4.50	5.00
Dark Pink Valencia	July 28	Tall	Large	Nov. 30	4.50	5.00	5.50
Rosalind	Aug. 7	Tall	Int.	Dec. 10	4.00	4.50	5.00

RED

Red Daisy	July 19	Med.	Int.	Nov. 5	5.00	5.50	6.00
Bittersweet	July 20	Med.	Int.	Nov. 8	5.00	5.50	6.00
Sarong	Aug. 7	Med.	Int.	Dec. 15	5.00	5.50	6.00
Christmas Star	Aug. 7	Med.	Int.	Dec. 20	7.00	7.50	8.00

*Anemone Flowered Varieties***YELLOW**

Sunray	July 22	Med.	Int.	Nov. 10	4.00	4.50	5.00
Susanne Miller	July 25	Tall	Large	Nov. 18	4.00	4.50	5.00
Yellow Supreme	Aug. 2	Med.	Large	Dec. 10	4.00	4.50	5.00

WHITE

Little America	July 19	Med.	Int.	Nov. 10	4.00	4.50	5.00
Shasta	July 22	Med.	Int.	Nov. 15	4.00	4.50	5.00
Long Island Beauty	July 25	Med.	Large	Nov. 20	4.00	4.50	5.00
Nevada	July 28	Med.	Int.	Nov. 25	5.00	5.50	6.00
White Supreme	Aug. 2	Med.	Large	Dec. 10	4.00	4.50	5.00
Garza Supreme	Aug. 4	Med.	Int.	Dec. 15	5.00	5.50	6.00

BRONZE

Yolanda	July 28	Med.	Int.	Nov. 25	4.00	4.50	5.00
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PINK

Norma	July 25	Tall	Large	Nov. 18	4.00	4.50	5.00
Beautiful Lady	July 28	Short	Large	Nov. 25	4.00	4.50	5.00
Dark Pink Supreme	Aug. 2	Med.	Large	Dec. 10	4.00	4.50	5.00

RED

Red Rolinda	July 25	Med.	Int.	Nov. 23	4.00	4.50	5.00
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Minimum Order 50 Cuttings of a Variety

Pot Plant Varieties

YELLOW

Name	Last Pinch	Type	Spray or Disbud	Matures	Price per 100		
					500 up	100 to 450	50
Gold Lode	Aug. 24	L. F. Dec.	Disbud	Oct. 15	\$4.00	\$4.50	\$5.00
Rodell Improved	Aug. 24	Int. Pom.	Spray	Oct. 20	4.00	4.50	5.00
Mrs. H. E. Kidder	Aug. 24	L. F. Inc.	Disbud	Oct. 20	4.00	4.50	5.00
Blazing Gold	Aug. 24	L. F. Inc.	Disbud	Oct. 25	4.50	5.00	5.50
Sunglow	Aug. 24	L. F. Inc.	Disbud	Oct. 25	4.00	4.50	5.00
Indianapolis Yellow	Aug. 29	L. F. Inc.	Disbud	Nov. 8	4.50	5.00	5.50
Yellow Beauty	Aug. 29	L. Pom.	Disbud	Nov. 10	4.00	4.50	5.00
Sunray	Sept. 3	Int. Anem.	Spray	Nov. 15	4.00	4.50	5.00
Yellow Fellow	Sept. 3	Int. Dec.	Spray	Nov. 15	4.50	5.00	5.50
Bonnaffon DeLuxe	Sept. 3	L. F. Inc.	Disbud	Nov. 20	4.00	4.50	5.00
Friendly Rival	Sept. 3	L. F. Inc.	Disbud	Nov. 20	4.00	4.50	5.00
Marie De Petris	Sept. 3	L. F. Inc.	Disbud	Nov. 23	4.00	4.50	5.00
Sun Gold	Sept. 8	L. F. Inc.	Disbud	Nov. 25	4.00	4.50	5.00

WHITE

Minong	Aug. 24	S. Pom.	Spray	Oct. 20	4.00	4.50	5.00
Christina	Aug. 24	L. F. Inc.	Disbud	Oct. 20	4.00	4.50	5.00
Granite State	Aug. 24	L. Pom.	Disbud	Oct. 25	5.00	5.50	6.00
Indianapolis White	Aug. 29	L. F. Inc.	Disbud	Nov. 8	4.50	5.00	5.50
Richard Mandell	Aug. 29	L. Pom.	Disbud	Nov. 10	4.00	4.50	5.00
Little America	Aug. 29	Int. Anem.	Disbud	Nov. 10	4.00	4.50	5.00
Marketeer	Sept. 3	L. F. Inc.	Disbud	Nov. 18	4.00	4.50	5.00
Long Island Beauty	Sept. 3	L. Anem.	Disbud	Nov. 20	4.00	4.50	5.00
Margaret Moeller	Sept. 8	L. F. Inc.	Disbud	Dec. 5	4.00	4.50	5.00

BRONZE AND RED

Indianapolis Bronze	Aug. 29	L. F. Inc.	Disbud	Nov. 8	4.50	5.00	5.50
Bronze Masterpiece	Aug. 29	L. Pom.	Disbud	Nov. 15	4.00	4.50	5.00
Gypsy	Aug. 29	S. Anem.	Spray	Nov. 15	4.00	4.50	5.00
Legal Tender	Sept. 3	Int. Dec.	Spray	Nov. 20	4.00	4.50	5.00
Red Rolinda	Sept. 8	Int. Anem.	Spray	Nov. 23	4.00	4.50	5.00

PINK

J. W. Prince	Aug. 29	L. F. Inc.	Disbud	Nov. 5	4.50	5.00	5.50
Indianapolis Pink	Aug. 29	L. F. Inc.	Disbud	Nov. 8	4.50	5.00	5.50
Thyra	Aug. 29	L. Pom.	Disbud	Nov. 10	4.00	4.50	5.00
Queen of the Pinks	Aug. 29	L. Pom.	Disbud	Nov. 10	4.00	4.50	5.00
Masterpiece	Aug. 29	L. Pom.	Disbud	Nov. 15	4.00	4.50	5.00
Helen Frick	Sept. 3	L. F. Inc.	Disbud	Nov. 25	4.50	5.00	5.50
Beautiful Lady	Sept. 3	L. Anem.	Disbud	Nov. 25	4.00	4.50	5.00

HARDY OR GARDEN VARIETIES

For retail sales or planting outside for early Cut Flowers, we offer the three following collections which include the better varieties.

Collection No. 1

500 rooted cuttings of our selection, 50 each of 10 taller varieties for cutting

\$25.00

Collection No. 2

500 rooted cuttings of our selection, 50 each of 10 medium to short varieties for bedding

\$25.00

Collection No. 3

500 rooted cuttings of our selection, 50 each of 5 varieties for cutting, 50 each of 5 varieties for bedding

\$25.00

Novelty Chrysanthemums

NEW VARIETIES OF A FEW YEARS AGO. DON'T FAIL TO ADD THESE TO YOUR LIST.

CAROLYN YOSICK

(OCTOBER 20)

This small, lavender pink pompon responds exceptionally well to black cloth shade and is particularly of value for August or September flowering along with Pinocchio and Gold Coast. You will welcome its dependable growing habit, as unlike Jewell, it does not crown, and compared with Jessie and Pink Dot, it has a more rigid stem than either one. The small decorative flower has excellent color-holding qualities even under the earliest shadings. Carolyn Yosick shows up best under artificial light that remarkably softens or brightens the color.

GOLD COAST

(OCTOBER 25)

A small, intense deep yellow pompon of firm substance flowering naturally October 25. Since Gold Coast can be shaded ideally, we are recommending it along with Pinocchio and Carolyn Yosick as the important trio for shading. It has the same clean, vigorous free growing habit of Pinocchio and also resembles this variety very much in its production. For cloth house growing, it is a top notch variety—easily grown and consistently dependable. In our opinion, Gold Coast is a "must" for early shading.

SENECA

(NOVEMBER 1)

An orange bronze decorative pompon with strong habit of growth that blooms November 1. The earliest bronze pompon in the cloth house shading program. It holds its color well. A very high producer, much better than Navaho. It is the most reliable bronze pompon for early shading. A much needed variety.

BITTERSWEET

(NOVEMBER 8)

A beautiful medium sized red daisy that blooms normally November 8. The flower possesses substance and keeping qualities that are superior to any existing red daisies suitable for cloth house culture. Bittersweet has a stiff wiry stem that produces well branched sprays.

NAVAHO

(NOVEMBER 10)

Designed for a cloth house, medium, decorative, red pompon. It blooms normally November 10th. Color is deep crimson; reddish bronze under early shading. Responds well to shading and fills a great need for a cloth house variety in its color range. Growth is strong and uniform. The 2½ inch flowers are well spaced on fine sprays.

RUSTICON

(NOVEMBER 20)

An intense rust red pompon for Thanksgiving. The flower is of a very attractive, decorative form having excellent substance and a very full petallage. The growth is vigorous and persistent. It is of extremely easy culture, its dark rigid sprays and high production combine to give it a definite place in the highly competitive Thanksgiving season. It possesses more vigor than Red Rolinda, a quality of flower far superior to Legal Tender and just precedes Bronze Goldsmith in flowering. The very appealing color of Rusticon is a rich blend of crimson and rust bronze which commands immediate attention at Thanksgiving.

HARVESTER

(NOVEMBER 23)

An intense canary yellow standard that blooms for Thanksgiving. The flower is of medium size, hard and durable, its bright, lustrous color; its wax-like petals and its very attractive semi-incurved form give this variety an appearance of substance and freshness that commands immediate attention. The foliage is attractive and healthy and is carried right up to the base of the flower. The stems are medium in size, strong and rigid. Harvester is a good shipper and is well liked by the retail trade. We recommend this variety to all growers as an easily grown bright yellow standard for the Thanksgiving season.

MINUET

(NOVEMBER 25)

A beautifully formed, clear pink pompon of medium size that blooms for Thanksgiving. It is of extremely easy culture; the habit being vigorous and free, with dark glossy foliage, strong stems and upright sprays. This seedling bunches, keeps, and ships unusually well. It is a reliable producer and responds well under a wide diversity of cultures. It blooms at a period when a lively pink of top quality is in great demand.

BRONZE GOLDSMITH

(NOVEMBER 25)

A sport from the original variety Goldsmith, similar to and richer in color than well-grown Red Princeton. Its color is always in keen demand. In growth and season, it is identical to the parent variety. Carefully grown, Bronze Goldsmith on disbudded sprays is, in quality and value for late September and October flowering in the cloth house.

OMEGA

(DECEMBER 5)

Omega is the best deep lemon yellow pompon to follow Sunnyside, maturing December 5. The formal flower possesses unusual substance and keeping qualities. Growth is strong, foliage dark and glossy, and the whole spray rigid and wiry. May we assure you that no blindness has been apparent and all tests indicate a high degree of resistance to verticillium.

ROOTED CHRYSANTHEMUM CUTTING ORDER

Fred C.
Gloeckner
&
Company.
Incorporated

15 East 26th Street New York 10, N. Y.

Ship To:

Date of Order					When Required					Ship Via:				
Quan.	Variety	Price per 100			Quan.	Variety	Price per 100			Quan.	Variety	Price per 100		
		500 up	100 to 450	50			Amt.	500 up	100 to 450			50	Amt.	500 up
.....	Albatross	4.50	5.00	5.50	Helen Frick	4.50	5.00	5.50	Red Daisy	5.00	5.50	6.00
.....	Anaconda	4.50	5.00	5.50	Imp. Tobin's Yellow	5.00	5.50	6.00	Red Princeton	4.50	5.00	5.50
.....	Arcadia	4.00	4.50	5.00	Imp. Yel. Chattanooga	4.00	4.50	5.00	Red Rolinda	4.00	4.50	5.00
.....	Barcarole	4.00	4.50	5.00	Indianapolis Bronze	4.50	5.00	5.50	Red Rust	6.00	6.50	7.00
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.....	Bonnaffon Deluxe	4.00	4.50	5.00	Jean Elizabeth	5.00	5.50	6.00	Rosalind	4.00	4.50	5.00
.....	Bronze Goldsmith	4.50	5.00	5.50	J. W. Prince	4.50	5.00	5.50	Rusticon	5.00	5.50	6.00
.....	Bronze Masterpiece	4.00	4.50	5.00	Legal Tender	4.00	4.50	5.00	Sarong	5.00	5.50	6.00
.....	Bronze Minuet	7.00	7.50	8.00	Little America	4.00	4.50	5.00	Seafoam	4.00	4.50	5.00
.....	Cameo	4.50	5.00	5.50	Long Island Beauty	4.00	4.50	5.00	Sea Gull	4.00	4.50	5.00
.....	Carolyn Yosick	6.00	6.50	7.00	Margaret Moeller	4.00	4.50	5.00	Seneca	6.00	6.50	7.00
.....	Cassandra	4.50	5.00	5.50	Marie DePetris	4.00	4.50	5.00	Shasta	4.00	4.50	5.00
.....	Chattanooga	4.00	4.50	5.00	Marketeer	4.00	4.50	5.00	Silver Sheen	4.00	4.50	5.00
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.....	Dark Pink Bulkeley	4.50	5.00	5.50	Matchless	5.00	5.50	6.00	Sunnyside	4.00	4.50	5.00
.....	Dk Pink Orchid Queen	6.00	6.50	7.00	Mefo	4.50	5.00	5.50	Sunray	4.00	4.50	5.00
.....	Dark Pink Valencia	4.50	5.00	5.50	Meteore	6.00	6.50	7.00	Thyra	4.00	4.50	5.00
.....	Debonair	5.00	5.50	6.00	Minong	4.00	4.50	5.00	Vesper	4.00	4.50	5.00
.....	December Glory Large	4.00	4.50	5.00	Minstrel	7.00	7.50	8.00	Vibrant	4.50	5.00	5.50
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.....	Harvester	6.00	6.50	7.00	Queen of Pinks	4.00	4.50	5.00				

WRITE ANY SPECIAL INSTRUCTIONS ON OTHER SIDE

Index

A	G	MASTERPIECE 37, 39	S
ALBATROSS 34	GARZA SUPREME 38	MATCHLESS 36	SARONG 38
ANACONDA 35	GLADYS PEARSON 35	MEFO 34	SEAFOAM 36
APRICOT VALENCIA 38	GOLD COAST 36	METEORE 34	SEA GULL 36
ARCADIA 36	GOLD LODGE 34, 39	MINONG 36, 39	SENECA 37
	GOLDEN ANNIVERSARY 33, 36	MINSTREL 32, 37	SHASTA 38
	GOLDEN HERALD 36	MINUET 37	SILVER SHEEN 34
B	GOLDEN JANE 38	MONUMENT 34	SM. LATE WHITE 34
BARCAROLE 36	GOLDEN MISTLETOE 34	MRS. KIDDER 34, 39	SNOW 36
BEAUTIFUL LADY 38, 39	GOLDEN MRS. ROSS 34	MRS. ROY 35	SUNGLOW 34, 39
BETSY ROSS 34	GOLDEN PEARSON 34		SUN GOLD 39
	GOLDEN SMITH 34		YSIDE 36, 37
			Y 38, 39
			NE MILLER 38
			JANA 38

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T	V	W	Y
..... 37, 39 36	UCKINGHAM 38	CADIA 36
	IT 36	DOTY 36	AUTY 39
		MENSA 38	MEO 36
		MISTLETOE 34	RDOVA 36
		SUPREME 38	ISY 38
			TEL. DOT 36
			YEL. FELLOW 36, 39
			YEL. MONUMENT 34
			YEL. MEFO 34
			YEL. QUEEN 34
			YELLOW SNOW 36
			YELLOW SUPREME 38
			YELLOW RAYONANTE 35
			YOLANDA 38
			YUKON 38
			YULEFLAME 32, 36
D	E	F	G
DETROIT NEWS 35	LEGAL TENDER 37, 39	FIRE BIRD 37	GREENHOUSE
	LITTLE AMERICA 38, 39	FRIENDLY RIVAL 34, 39	LEAF TYER 23
	L. I. BEAUTY 38, 39		INSECTICIDES AND
	MARIE DePETRIS 34, 39		FUNGICIDES 37
	MARGARET MOELLER 34, 39		INSECTS AND
	MARKETEER 34, 39		THEIR CONTROL 22, 25
	MARY L. HALL 36		LARGE FLOWERED
	MARY McARTHUR 33, 37		VARIETIES 34, 35
			LEAF MINER 22
			MEALY BUGS 24
			MIDGE 22
			MILDEW 26
			MITES 4
			MULCHES 24
			NEMATODE, FOLIAR 26
			NEMATODE,
			ROOT KNOT 26
			NEWER INSECTICIDES 29
			NOVELTY CHRY-
			SANTHEMUMS 32, 33
			PESTS AND THEIR
			CONTROL 28
			PINCHING 5
			PLANTING 3
			POMPON VARIETIES 36
			POT PLANT CULTURE 20, 21
			POT PLANT
			VARIETIES 39
			RED SPIDER 24
			RE-SELECTION
			PROGRAM 31
			ROOT ROT 27
			RUST 27
			SEPTORIA LEAF SPOT 27
			SHADING
			INFORMATION 15, 19
			SHIPPING FLOWERS 9
			SINGLE VARIETIES 38
			SOILS 2
			SOW BUGS 25
			SPIDER VARIETIES 35
			SPRING FLOWERED
			CHRYSANTHEMUMS 12, 14
			STEAM STERILIZATION .. 2
			STUNT 30, 31
			SYMPHYLIDS 24
			TARNISHED PLANT BUG 25
			TAKING BUD 6
			TEMPERATURE 9, 12
			THRIPS 25
			TIME PINCHING 5
			VERTICILLIUM WILT 27
			WATERING 7

ACIDITY 2	GREENHOUSE	NOVELTY CHRY-	SHIPPING FLOWERS 9
AERATION 2	LEAF TYER 23	SANTHEMUMS 32, 33	SINGLE VARIETIES 38
AIR FREIGHT 1	INSECTICIDES AND	PESTS AND THEIR	SOILS 2
ANEMONE VARIETIES 38	FUNGICIDES 37	CONTROL 28	SOW BUGS 25
APHIDS 22	INSECTS AND	PINCHING 5	SPIDER VARIETIES 35
BLINDNESS 2	THEIR CONTROL 22, 25	PLANTING 3	SPRING FLOWERED
CHEMICAL	LARGE FLOWERED	POMPON VARIETIES 36	CHRYSANTHEMUMS 12, 14
STERILIZATION 2	VARIETIES 34, 35	POT PLANT CULTURE 20, 21	STEAM STERILIZATION .. 2
CORN EAR WORM 23	LEAF MINER 22	POT PLANT	STUNT 30, 31
CULTURAL POINTERS 1, 9	MEALY BUGS 24	VARIETIES 39	SYMPHYLIDS 24
CULTURED STOCK 9	MIDGE 22	RED SPIDER 24	TARNISHED PLANT BUG 25
CUT WORMS 23	MILDEW 26	RE-SELECTION	TAKING BUD 6
CUTTING FLOWERS 8	MITES 4	PROGRAM 31	TEMPERATURE 9, 12
DELAYED FLOWERING 11	MULCHES 24	ROOT ROT 27	THRIPS 25
DISBUDDING 6	NEMATODE, FOLIAR 26	RUST 27	TIME PINCHING 5
DODDER 27	NEMATODE,	SEPTORIA LEAF SPOT 27	VERTICILLIUM WILT 27
FERTILIZERS 4	ROOT KNOT 26	SHADING	WATERING 7
GARDEN VARIETIES 39	NEWER INSECTICIDES 29	INFORMATION 15, 19	

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Index

A	G	MASTERPIECE 37, 39	S
ALBATROSS 34	GARZA SUPREME 38	MATCHLESS 36	SARONG 38
ANACONDA 35	GLADYS PEARSON 35	MEFO 34	SEAFOAM 36
APRICOT VALENCIA 38	GOLD COAST 36	METEORE 34	SEA GULL 36
ARCADIA 36	GOLD LODE 34, 39	MINONG 36, 39	SENECA 37
	GOLDEN ANNIVERSARY 33, 36	MINSTREL 32, 37	SHASTA 38
B	GOLDEN HERALD 36	MINUET 37	SILVER SHEEN 34
BARCAROLE 36	GOLDEN JANE 38	MONUMENT 34	SM. LATE WHITE 34
BEAUTIFUL LADY 38, 39	GOLDEN MISTLETOE 34	MRS. KIDDER 34, 39	SNOW 36
BETSY ROSS 34	GOLDEN MRS. ROSS 34	MRS. ROY 35	SUNGLOW 34, 39
BITTERSWEET 38	GOLDEN PEARSON 34		SUN GOLD 39
BLAZING GOLD 34, 39	GOLDSMITH 36	N	SUNNYSIDE 36, 37
BONNAFFON DeLUXE 34, 39	GOOD NEWS 34	NAVAHO 37	SUNRAY 38, 39
BROCADE 38	GRANITE STATE 39	NEVADA 38	SUSANNE MILLER 38
BR. BUCKINGHAM 38	GYPSY 39	NORMA 38	SYLVANNA 38
BR. GOIDSMITH 37		NUGGETS 36	
BR. MASTERPIECE 37, 39	H		T
BR. MINUET 33, 37	HARVESTER 34		THYRA 37, 39
BR. MISTLETOE 35	HASEGAWA PINK 38		
	HELEN FRICK 35, 39		V
C			VESPER 36
CAMEO 36	I		VIBRANT 36
CAROLYN YOSICK 37	IMP. TOBIN'S YELLOW 34		
CASSANDRA 37	IMP. YEL. CHATTANOOGA 34		W
CHATTANOOGA 34	IND. BRONZE 35, 39		W. H. BUCKINGHAM 38
CHRISTINA 39	IND. PINK 35, 39		WHITE DOTY 36
CHRISTMAS STAR 32, 38	IND. WHITE 34, 39		WHITE MENSA 38
CONSTELLATION 36	IND. YELLOW 34, 39		WHITE MISTLETOE 34
CORDOVA 36	IRENE 36		WHITE SUPREME 38
COTTON TOP 36			
	J		Y
D	JEAN ELIZABETH 34		YEL. ARCADIA 36
DK. PK. BUIKELEY 37	JESSIE 37		YEL. BEAUTY 39
DK. PK. ORCHID QUEEN 35	JEWELL 37		YEL. CAMEO 36
DK. PK. SUPREME 38	J. W. PRINCE 35, 39		YEL. CORDOVA 36
DK. PK. VALENCIA 38			YEL. DAISY 38
DEBONAIR 37	K		YEL. DOT 36
DECEMBER GLORY LARGE 34	KAY TASHIMA 35		YEL. FELLOW 36, 39
DETROIT NEWS 35			YEL. MONUMENT 34
	L		YEL. MEFO 34
E	LEGAL TENDER 37, 39		YEL. QUEEN 34
ED. SEIDEWITZ 35	LITTLE AMERICA 38, 39		YELLOW SNOW 36
	L. I. BEAUTY 38, 39		YELLOW SUPREME 38
F	MARIE DePETRIS 34, 39		YELLOW RAYONANTE 35
FIRE BIRD 37	MARGARET MOELLER 34, 39		YOLANDA 38
FRIENDLY RIVAL 34, 39	MARKETEER 34, 39		YUKON 38
	MARY L. HALL 36		YULEFLAME 32, 36
	MARY McARTHUR 33, 37		

ACIDITY 2	GREENHOUSE	NOVELTY CHRYSANTHEMUMS 32, 33	SHIPPING FLOWERS 9
AERATION 2	LEAF TYER 23	PESTS AND THEIR CONTROL 28	SINGLE VARIETIES 38
AIR FREIGHT 1	INSECTICIDES AND FUNGICIDES 37	PINCHING 5	SOILS 2
ANEMONE VARIETIES 38	INSECTS AND THEIR CONTROL 22, 25	PLANTING 3	SOW BUGS 25
APHIDS 22	LARGE FLOWERED VARIETIES 34, 35	POMPON VARIETIES 36	SPIDER VARIETIES 35
BLINDNESS 2	LEAF MINER 22	POT PLANT CULTURE 20, 21	SPRING FLOWERED CHRYSANTHEMUMS 12, 14
CHEMICAL STERILIZATION 2	MEALY BUGS 24	POT PLANT VARIETIES 39	STEAM STERILIZATION .. 2
CORN EAR WORM 23	MIDGE 22	RED SPIDER 24	STUNT 30, 31
CULTURAL POINTERS 1, 9	MILDEW 26	RE-SELECTION PROGRAM 31	SYMPHYLIDS 24
CULTURED STOCK 9	MITES 24	ROOT ROT 27	TARNISHED PLANT BUG 25
CUT WORMS 23	MULCHES 4	RUST 27	TAKING BUD 6
CUTTING FLOWERS 8	NEMATODE, FOLIAR 26	SEPTORIA LEAF SPOT 27	TEMPERATURE 9, 12
DELAYED FLOWERING 11	NEMATODE, ROOT KNOT 26	SHADING INFORMATION 15, 19	THRIPS 25
DISBUDDING 6	NEWER INSECTICIDES .. 29		TIME PINCHING 5
DODDER 27			VERTICILLIUM WILT 27
FERTILIZERS 4			WATERING 7
GARDEN VARIETIES 39			

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